# BLUE BOOK

SEPTEMBER 1946

Jack—
This seems like the real way to This seems like the real way to the pin down responsibility on our gear pin down responsibility for our gear tools. Believe michigan food types tools. Believe that produces all types tools outfit that produces all types tools outfit that produces all types tools outfit that produces all types only outfit away of not let's get one their catalogs? If not let's get one their catalogs?

o Divided esponsibility ere

ROUGHING TOOLS	PRE-SHAVE TOOLS	FINISHING TOOLS	SUPPLIER
HOBS	HOES	HOBS	MICHIGAN TOO
SHAPER CUTTERS	SHAPER CUTTERS	SHAPER CUTTERS	MICHIGAN TOO
GEAR MILLING CUTTERS		GEAR MILLING CUTTERS	MICHIBAN TOO
SHEAR SPEED CUTTERS	SHEAR SPEED CUTTERS		MICHIGAN TOO
		RACKS	MICHIGAN TOOL
		ROTARY CUTTERS	MICHIGAN TOOL
		LAPS	MICHIGAN TOOL
		BURNISHERS	MICHIGAN TOOL

Write for complete catalog on your company letterhead

MICHIGAN TOOL COMPANY

7171 E. McNICHOLS ROAD

DETROIT 12, U.S.A.



An arc welder needs "innards" to stand up under the strain of present day operation well sir, HOBART has more "innards" than most arc welders. The liberal design of a HOBART you'll find has more copper, more steel, more good insulation, precision bearings and accurate controls, all engineered into a simplified arc welder which makes its performance stand out head and shoulders above the pack.

# Welders like them for their uniform quality weldshilly and characteristics for making strong ductile welds at much greater speeds. OBART ARC WELDERS

BART ELECTRODES

HOBART BROTHERS CO., Box TB-96 Troy, Ohio
Piese send me items checked below, without obligation.

 Complete Welding Equipment Couldog.

S ...... enclosed for \_\_\_vals, "Practical Design for Arc Welding"

Position Firm

Address

Vest Packet Welders' Guideheck for your capies day!

Check How Many.



PRACTICAL DESIGN

#### PRECISION

- Dynamically balanced design.
- Guaranteed to turn or bore within .0002" dla. in five inches.
- Self-centering collet work-holding method.
- Vibration-free ballbearing spindle.
- Positive turret reindexing within .0003".

#### VARIETY

- Eight successive operations finishmachined at one chucking.
- \* Internal or external thread chasing.
- Double tool slide for straight or taper turning, forming or cutting off.
- Uses push-out or draw-in collet, step or jaw chuck.

#### EASE OF OPERATION

- Single lever spindle speed control.
- Self-locking turret head.
- Positive stops for duplicating size.
- Vee-belting replaceable without disturbing spindle or drive.
- Automatic brake; pneumatic bar feed.

The Rivett No. 918 Plain Cabinet Turret Lathe is on efficient producer of small duplicate parts. The combination of true running work and precise tool indexing creates a place for this turret lathe in fine manufacturing.

If you have a production problem requiring second operation or initial machining of small finely made parts from stainless steel, brass, plastic or other material, the Rivett 918 guarantees a lower cost solution. Write for Bulletin 918T.



## RIVETT LATHE & GRINDER, Inc.

BRIGHTON . BOSTON . MASS. . U. S. A.



Since 1890, Hardinge has symbolized accurate, durable, and low priced collets for all types and sizes of machines. Specify Hardinge collets and you will obtain maximum production efficiency in addition to these extra services:

#### ONE SOURCE OF SUPPLY

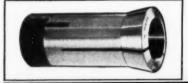
You can standardize on Hardinge Collets and have a complete selection for all makes of lathes.

#### PROMPT DELIVERY FROM STOCK

Collet stocks are constantly maintained in ten convenient locations throughout the United States: West Hartford; New York City; Elmira; Rochester; Cleveland; Detroit; Chicago; Minneapolis; Los Angeles; and San Francisco. No production hold-ups for Hardinge collets.

#### SIMPLIFIED ORDERING

Purchasing and Engineering Departments welcome the Hardinge Reference List which simplifies ordering because there is a Hardinge collet for every make of machine.



Take advantage of Hardinge complete collet facilities. Write today for Bulletin 41 which includes the special reference list and describes and prices Collets for all Lathes and Millers.

HARDINGE BROTHERS, INC., ELMIRA, N. Y.

"PERFORMANCE HAS ESTABLISHED LEADERSHIP FOR HARDINGE"

# RMSTRONG

#### SYSTEM OF TOOL HOLDERS

#### **DOUBLES** (even triples) PLANER PRODUCTION

The ARMSTRONG Gang Planer Tool not only ends costly delays for "tooling-up," it actually reduces planing time as much as 75%—multiplying machining profits proportionally. It is the correct tool for planing large surfaces. Carrying 4 square cutter bits, this tool makes not one but four cuts with each traverse of the bed. The head of this tool swivels and is graduated so that it can be quickly and accurately set to any desired feed.

The Armstrong System of Tool Holders provides the correct tools for every operation on lathes, planers, slotters and shapers. Each is an efficient profit-building tool-a permanent multi-purpose ARMSTRONG TOOL HOLDER that "Saves: All Forging. 70% Grinding and 90% High Speed Steel". Your industrial distributor has them in stock.



As each chip is comparatively light, a planer will, with this tool, carry with ease a feed and depth of cut much greater than is possible when using an ordi-nary tool, and there is much

# nary tool, and there is less tendency to "break at the end of cut.

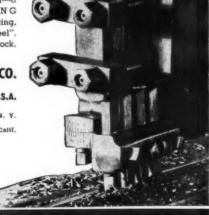
#### ARMSTRONG BROS. TOOL CO.

"The Tool Holder People"

308 N. Francisco Ave., Chicago 12, U.S.A.

Eastern Whie, and Sales:
199 Lafayette St. New York 12, N. Y. Pacific Coast Whee, and Sales Office: 1275 Mission St. San Francisco 3, Calif.

Booth 211 ASTE Show, Cleveland April 8th-12th





## Machine Tool Blue Book

Hitchcock Publishing Co., 542 So. Dearborn St., Chicago 5

Published Monthly

Volume 42, No. 9

#### SEPTEMBER 1946

Featured in This Issue	-	-			-				123
Editor's Page			-						125
Removing the "Ants" from Co By D. C. Miner	olan	its				*	*	•	129
Precision Measurement By Warren Baker	•	•		•	•		*	•	141
Saving Material with Contour By H. J. Chamberland	Sav	vs		-				*	177
Carbide Tool Misconceptions By Harry Crump		*		•	*	•			185
Beading for Sheet Metal Guar By H. F. Williams	ds	-	*	•	•	•	*	-	189
Carbide Mandrels—Their Care By A. E. Glen	and	l Se	ervio	ing		*			197
Your Tax Problems By Arthur Roberts	•		*		*				215
A New Protective Plastic -	-	-	-	*		-		*	225
Widening Useful Boring Range By H. E. York	-	•	•					•	231
Foremanship Forum By Edmund Mottershead		*			•				237
Pneumatic Tools Help to Speed	Ind	lust	ry		*	*	*		249
Let's Talk Shop		-		*					261
What's New in Metal Working		*		*			*		272
Mechanics Through the Ages		•	-						388
Advertiser's Products Index -		-	-						394
Index to Advertisers				-					398



R. C. Van Kampen, President J. E. Hitchcock, Vice President M. L. Yonts, Secretary Wesley G. Paulson, Editor-in-Chief Ned Bailey, Managing Editor Vincent C. Hogren, Business Mgr. C. E. Elzinga, Circulation Mgr.

#### Representatives

W. E. Hoffman, Portland, Conn., Phone: 2946
A. E. Wailes, 55 W. 42nd St., N. Y. 18, N. Y., Phone: Lackawanna 4-4528
A. C. Feigert, 303 Evans-Central Bldg., Van Wert, Ohio, Phone 2342
R. H. Deibler, 403 W. 8th St., Los Angeles 14, Cal., Phone: Tucker 1579
H. J. Smith, 542 S. Dearborn St., Chicago 5. Ill., Phone: HARrison 6040
Franklyn H. Olsen, 435 Penton Bldg., Cleveland 13, Ohio, Phone Main 9459
John A. Wright, 8630 West Outer Drive, Detroit, Mich., Phone Garfield 9093.

(Copyright 1946, by Hitchcock Publishing Co., Chicago 5, Ill.)

Phone: HARrison 6040

Cable Address: HITCHPUB

# PREVENT DANGEROUS

Work Seizure!

#### For SAFETY-Use Only



Anti-Scoring
CENTER POINT OIL

To avoid personal injury, ruined work, and costly delays, lubricate centers, steady rests, cams and other machine parts with CMD Center Point Oil. It withstands pressure greater than 50,000 lbs. per square inch. Try it free! See for yourself!



#### Mail Coupon Now!

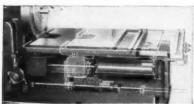
FREE TEST KIT CHICAGO MANUFACTURING & DISTRIBUTING CO. Dept. 8-BB, 1928 West 46th Street, Chicago 9, Illinois Without obligation, please send us a free test kit of one tube of CMD Center Point Oil and one tube of CMD Center Point Lube. Also, send 4-page folder on 30 uses for CMD lubricants.

COMPANY NAME.....

DRESS.....



#### is supported by solid metal from the floor up!



THE SIMPLIMATIC PLATEN TABLE rests on and against hardened and ground steel ways and gibs. It has a fast, smooth traverse to and from cutting position, actuated by pneumatic cylinders.



VERTICAL HEAD TOOLING can be creanged instead of on horizontal platen table when desired. Here, too, you have maximum rigidity and solid support for tools right to the cutting edge.

The heavy platen table of the Simplimatic automatically locks after it traverses to cutting position. Thus it and all the tooling on it become virtually one ptece with the bed.

Because of the freedom in positioning slides on the big platen table, tools can be held close to their cutting edges and favored in any way desired. Moreover, this freedom from chatter is permanent because slide top is mounted on hardened steel ways and gibs.

Combined with the solidity of the cutting tools is the precision-fitted spindle of large diameter, on widely spaced roller bearings and its large herringbone drive gear mounted close to the nose. There's no chance anywhere for vibration. Chatter is designed out!

That's why Simplimatics can hold to extremely close tolerances, on large parts and at high production speeds. Ask for complete information about the Simplimatics.

Look Ahead...Keep Ahead...with Gisholt

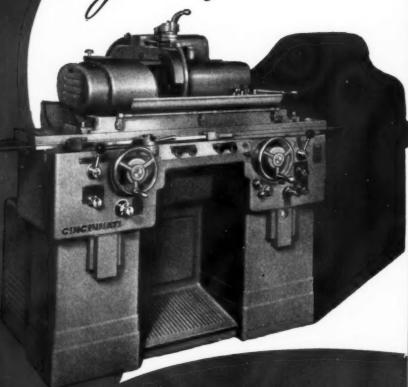


GISHOLT MACHINE COMPANY

1185 E. Washington Avenue, Madison 3, Wisconsin

NEW

Trinding Machine



CINCI

CINCINNATI

CENTER TYPE CRUMBING A LAWN

by Cincinnati

## THE A" PLAIN HYDRAULIC

● This new member of the CINCINNATI line of FILMATIC bearing grinding machines is designed for precision traverse grinding operations on small work. It swings 4" diameter over the table, and is built in 12" and 18" between-center lengths. The machine has many new and exclusive features such as: FILMATIC grinding wheel spindle bearings; hydraulic table traverse, infinitely variable from 3 to 280 inches per minute; accuracy of table reversal within .001"; dog controlled table traverse stroke as short as 1/16"; automatic pressure lubricating system for table and wheelhead ways; dial controlled pick-feed adjustment. ¶ A tabulation of all design features and specifications may be obtained by writing for catalog G-520. A brief description of this machine will be found in Sweet's Catalog File for Mechanical Industries.

GRINDERS INCORPORATED

CINCINNATI P, ONIO, U.S.A.

CENTERIES CHINDING MACHINES

CONTERLESS LAPPING MACHINE



The three factors that you must watch on your chipping jobs are the amount of metal removed, the time required to remove it, and the cost of removing the metal.

First: The amount of metal removed depends upon the selection of the right chipping hammer for the job. For your selection our complete line includes four different types and many sizes.

Second: The time required to remove the metal is important. Chipping hammers lead a rugged life, and their cutting efficiency may take a terrific drop if certain factors are not watched and checked periodically. Our engineers are specially trained in the proper operating and maintenance

techniques required to give you the highest degree of chipping hammer "cutting efficiency."

Third: The cost of removing the metal involves factors one and two as well as several others, such as—correct air pressure at the tool—efficient layout—correct chisel shapes—standard tests for "cutting efficiency," etc.

They all sum up to the fact that I-R hammers and I-R "cutting efficiency service" can produce the results you need to turn out more and better jobs. Call our nearest office. Our engineers are ready to help you. Also yours for the asking is a two-color wall chart on chipping hammer repairs, Form 5634. Send for a copy now.

CHIPPERS • DRILLS • GRINDERS RIVETERS • WRENCHES • HOISTS Ingersoll-Rand

# When they ask for

SS SPEED REAMERS TRADE MARK REG. U S. PAT. OFF.

# THEY GET MAXIMUM TOUGHNESS AT MINIMUM COST

Good tools help any machinist do a better job . . . at lower cost. This explains why there is such a steady demand for PEERLESS High Speed Reamers and the many other CLEVELAND Tools of equally high quality— Twist Drills, Screw Extractors, Arbors, Mandrels, Sockets, Mills, Counterbores, and MO-MAX High Speed Ground Tool Bits and Cut-off Blades.





# In One Minute — You Can Set Up the SUNNEN Precision Honing Machine to Handle. Any Diameter From .125" to 2.625"

The Sunnen Precision Honing Machine can be changed from one job to another with very little set-up time. Ideal for either short or long runs.

The Sunnen Precision Honing Machine is being used to advantage on production runs as well as in tool rooms, salvage and maintenance work, where job requirements change from hour to hour. Accuracy within .0001", surface finishes as fine as the job requires.

#### Here are some other things this machine will do for you:

Produce a straight, round hole every time; eliminate bell-mouth, taper, and "rainbow" condition; correct errors of previous machine operations; align two holes of the same diameter—without skilled help or expensive equipment, and at low operating cost.

The Sunnen Precision Honing Machine produces work that regularly passes inspection gauged by the most modern scientific instruments—as shown above.



Write today for complete details—or have a Sunnen Engineer come in to show you what this honing machine can do on your jobs—in your plant.

#### SUNNEN PRODUCTS COMPANY

7935 Manchester Ave. • St. Louis 17, Mo.

UNNEN

Canadian Factory: Chatham, Ontario



Aircraft Hydraulic Brake Cylinder. Honing 3 times faster than lapping—and gave a straighter hale.



Aircraft Valve Tappet Roller. Honed after grinding to give 100% bearing surface.



Aircraft Carbureter Operating Valve Sleeve. Sunnen haning eliminates distortion from assembling operation.



Hydraulic Control Bushing, Honing gives straight round hole after rough reaming.



Aircraft Piston Pin. Sunnen honing is twice as fast and gives a cleaner, better looking pin. Quality Control made simple
...by the use of BRYANT
THREAD
GAGES



Internal



External

Quality control – essential to mass production of threaded parts — often slows assembly lines, when time-consuming, conventional gaging methods are used. Yet, inspection can be simple, accurate to any desired tolerance, and extremely fast if you use Bryant Thread Gages. They are easily operated at top speed by anyone. The operator need only squeeze the control lever, drop the part onto the work holder, release the lever. An immediate engagement is made on all the threads. He gives the work a partial turn and the threads.

all over. The dial indicator shows the averall occuracy within required tolerances, or accumulated inaccuracies of lead, pilch, diameter and thread form or the presence of burrs. And no "feel for fit" is required and these gages are four-to-five times faster than ring and plug gages.

Do you value quality control in your plant ? Then send us part prints covering your problems — our engineers will be glad to advise you. Send the coupon below for Illustrated Catalog G-3.



Thread Gages, also Squareness of Face Gages, Universal Diameter Size Gages.

Please send me Catalog No. G3 which gives complete details on the Bryant Thread Gages.

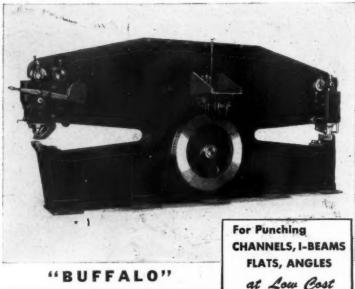
Company

City\_\_\_\_State\_

BRYANT

BRYANT CHUCKING GRINDER CO. SPRINGPIELD, VERMONT, U. S. A.

# For Rapid-Fire Punching and Shearing on the HEAVY-DUTY Jobs



DOUBLE END PUNCH AND SHEAR

Designed to meet the most rigid requirements of heavy fabrication, the "Buffalo" Double End Punch and Shear combines accuracy with exceptional speed in one unit. Its famous electrically welded steel plate construction gives it great strength with lightness. Available in either motor or pulley drive in sizes to suit your needs.

If your work calls for heavy-duty notching, coping and punching, it will pay you to investigate the efficient, money-saving features in this durable "Buffalo" fabricator. Simply send for Bulletin 304-B.

BUFFALO FORGE COMPANY
161 MORTIMER STREET
BUFFALO, N. Y.

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.



DOUBLE END PUNCH AND SHEAR

# DOUBLE-ACTION DOUBLE-ACTION

# LUBRO-BRUSH

#### CELIMINATES HAND CLEANING AND LUBRICATION

You get fully automatic cleaning and lubrication of taps, reamers, drills and countersinks with the Jarvis Lubro-Brush. Easily installed on any standard drill or punch press, small lathe or hand miller.

#### ASSURES GREATER TOOL LIFE

Field tests prove that the Jarvis Lubro-Brush adds from 20% to 80% to tap, drill and reamer life. Punches and dies also give longer service. So inexpensive that you can put one on every machine. Write today for fully descriptive Lubro-Brush bulletin.

The CHARLES L. JARVIS CO. Middletown, Connecticut



# 46 YEARS of PRECISION MANUFACTURING

#### You Will Find

REID PRECISION SURFACE GRINDERS
BUILT TO HANDLE YOUR WORK IN AN
EFFICIENT AND TIME-SAVING WAY.
EVERY POSSIBLE IMPROVEMENT HAS
BEEN MADE TO ASSURE YOU CLOSE TOLERANCE AND A FINER FINISH AT LOWER
COST. ALL WORKING PARTS ARE DESIGNED AND FITTED TO PREVENT ABRASIVES FROM PENETRATING AND CAUSING
UNDUE WEAR. ACCESSIBILITY AND NEW
DESIGN OF HANDWHEELS ASSURE YOU
OUTSTANDING PRECISION MACHINE.

BALANCED DESIGN - ATTRACTIVE FINISH.
MODERATE COST.

MODEL 2-B ALL-ELECTRIC POWER FEED.

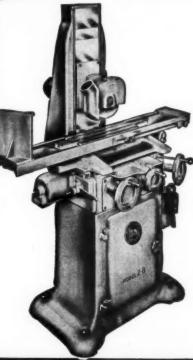
THE REID MODEL 2-C HAND-FEED ALSO IS AN EXCEPTIONAL MACHINE FOR TOOL, GAGE, DIE AND CERTAIN PRODUCTION GRINDING.

MACHINES EQUIPPED FOR WET GRINDING
IF REQUIRED.

#### **EXCELLENT DELIVERIES**

DISTRIBUTORS CONVENIENTLY LOCATED IN ALL SECTIONS

Write Dept. G for Illustrated Bulletin and Prices.



# REID BROTHERS COMPANY, INC.



THE Supossible"

#### WITH DOALL CONTOUR SAWING

- Miracle Method of Low-Cost Production
- World's Fastest Metal-Removing Process

No metal-cutting process except Contour Sawing can do these two jobs, leaving cutouts and leftover stock intact. Other metal-cutting processes waste time reducing stock to worthless chips. Contour Sawing slices stock; leaves only a I/I6-in. kerf. Hundreds of superhard, razor-sharp teeth on a narrow band cut continuously through hard, tough metals as much as 30 in. thick. Apprentices soon do expert work—do not need years of experience.

Contour Sawing is an entirely new approach to low-cost production. Jobs done slowly by other methods are "naturals" for fast Contour Sawing. It magically reproduces parts usually cast or forged; turns out shop jigs and fixtures; makes cams; cuts sheet-metal stampings; patterns and templates.

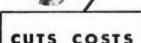
Advantages of Contour Sawing shown in free booklet "DoALL Equals Ten Plus". Write for one if you want to see production zoom and costs sag!



AACHINE-TOOL DIVISION MINNEAPOUS 4, MINN FILTERS Cutting Fluids
AT LOW COST

Recommended by Grinder and Hone Manufacturers

Thousands of Fostoria Coolant Filters in thousands of plants attest to the high efficiency and economy of this production tool. Only with a clean cutting fluid can you get fine grinding finishes. And a clean fluid means lower grinding costs. You can depend on Fostoria Filters to keep fluids clean. Inexpensive and easy to install on each machine. Try one on approval, today.



Doubles Wheel Life

Reduces Wheel Dressing

\*

**Speeds Production** 

\*

**Makes Finer Finishes** 

\*

Eliminates Spoilage



Write for complete facts on Fostoria Localized Coolant Filtering as used and recommended by nearly all grinder and hone manufacturers.

THE FOSTORIA PRESSED STEEL CORP.

FOSTORIA, OHIO



# of CIRCLE-C Super High-Speed Steel

Forty-eight flat broaches equip this enormous and powerful machine tool used for broaching and machining 8-cylinder cast-iron engine blocks.

The machine builder insisted on the finest high-speed tool steel

obtainable for broach inserts.

Circle-C Super High-Speed Steel was selected by a committee of technical experts because of its recognized reputation for quality, its uniform hardenability and its unequalled cutting capacity.



Offices: McKeesport, Pa., New York Hartford Philadelphia Pittsburgh Cleveland Dayton Datroit Chicago Les Angeles

# 45 HOLES DRILLED AT THE PUSH OF A BUTTON.



At the Weber Showcase & Fixture Co., Los Angeles, Calif., with the set-up of Govro-Nelson Automatic Drilling Units illustrated, 45 holes of .201" diameter are drilled at one time in an aluminum part, at the push of a single button.

This is but one of many examples of how the time and cost of drilling operations are being reduced tremendously by multiple-drilling—made possible through the use of Govro-Nelson compact Automatic Drilling Units.

If you have a problem of speeding up drilling and lowering drilling costs, write us for our recommendation. No obligation.

WRITE FOR Literature

GOVRO-NELSON CO.

1933 Antoinette Detroit 8, Mich.

automatic DRILLING UNIT



# No A. The Great Match Trick...

The problem: Shift the positions of two matches, and reduce the number of squares from five to four — all of equal sizes.

Strong minds have gone to pieces over this little proposition, yet even the village idiot should be able to solve it easily.

For that's the way it is with many of the toughest problems. They're idiotically simple — once you know the solution.

Metal turning costs are a problem. The chances are that turning accounts for 25 per cent or more of all machining time in your plant.

There are cases in our files of savings of hundreds of dollars problems.

a month in the manufacture of a single part by the use of Janes & Lamson machines. Our machines are designed specifically for the most efficient use of carbide tools which can remove metal 200 to 500 per cent faster. We have solved many tough cost problems. Solving them is our business.

Be skeptical of the production efficiency of all metal turning equipment in your plant.

Telephone or write for a Janes & Lamson engineer who will be glad to consult with you on all phases of your metal turning problems.



#### JONES & LAMSON

MACHINE COMPANY Springfield, Vermont, U.S.A. Manufacturer ef: Universal Türret Lathus e Fay Aufkmatic Lathuse Automatic Double-End Milling and Centering MachineseAutomatic Theodory o Optical Compositors e Automatic Opening Threading Das and Chasers e Ground Thread Fast Reling Dies.

# VELSEY SURFACE PLATES ARE OLIVINE DIABASE

HARDER AND DENSER THAN GRANITE



Commercially known as black granite, Olivine Diabase is actually similar to basalt. It approaches the diamond in hardness (7:10). It is 15% heavier than granite and only 1/30th as absorbtive.

Due to the hardness and density of VELSEY Surface Plates, they can be finished to extreme surface flatness and will last indefinitely with ordinary care.

#### STABILIZED BY NATURE

The structure of VELSEY Black Granite Surface Plates was stabilized ages ago in the bowels of the earth. Hence they are free from the internal stresses and strains inherent in man-made structures.

VELSEY Surface Plates do not sag and warp. They are non-freezing, non-magnetic, non-abrasive, rust-proof, shock-proof.

#### TWO SERIES

The Master Series of VELSEY Black Granite Surface Plates are finished to .00005" surface accuracy. Considerably lower in price, the Standard Series are finished to .0001" surface accuracy. Regular sizes in both series are 12" x 18", 18" x 24", and 24" x 36".

Special sizes are made to order. There is practically no limit to the possible dimensions.

Thousands of VELSEY Black Granite Surface Plates are giving extraordinary satisfaction. If you are not acquainted with these superior surface plates, it will pay you to order one or more soon and learn their advantages by actual use.

MAIL COUPON or write for details. Also indicate if you desire information on STATE TOOLS.

end complete urface Plates		ELSEY Black Granite SET Boring Tools and
	Individual	
	Company	· · · · · · · · · · · · · · · · · · ·
	Street Addre	95
City	Zone	State



Foot Operated AUTOMATIC OR MANUAL RETURN FOR HOLDING OPERATIONS

· Easy to install. Low in cost.

- · Exceptionally rugged construction.
- · Adaptable to all shop uses.
- Available with or without the MARTON 4-WAY COMBINATION UNIT.

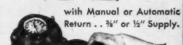
#### COMBINED FOR ADDED EFFICIENCY

the new Lehigh-MARTON Piston-Type laive with the popular and versatile Lehigh - MARTON

I-WAY COMBINATION UNIT (See Description Below)

Model 2-MA9 - COMBINATION Hand Valve with Manual or Automatic Return . . %" or 1/2" Supply

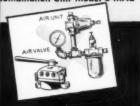








Combination Unit Model 3-MA2



#### ONE UNIT DOES THE WORK OF FOUR 4-WAY COMBINATION PACKLESS VALVE

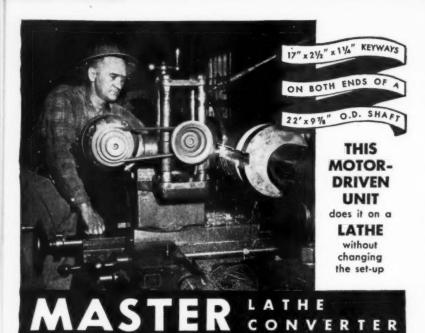
The finest unit on the market! Combines VALVE, GAUGE, REGU-LATOR, LUBRICATOR, STRAINER. Eliminates pipe fittings. Simplifies installation. Speeds production. Streamlines designing. For 2-3-and 6 way action. Packless valves are also available in Hand Models and in an exceptionally accurate Delayed Action Valve. WRITE FOR DATA SHEETS

ehigh Foundries, Inc.

Plant & General Offices: EASTON, PENNA.

**New England Representative** 

MARTON EQUIPMENT, INC., 195 Cabot St., Beverly, Mass.



Save set-up time; save shut-downs. Any work-piece (up to the capacity of your lathe) can be milled, ground or bored. Inter-



SIDE MILL used with basic milling unit. A 1" keyway  $\frac{1}{2}$ " deep in a  $4\frac{1}{2}$ " O.D. shoft cut is  $1\frac{1}{2}$ " per minute.



changeable heads and universal adjustments make the Master

External Grinding Head (adjustable to all angles) provides additional operations for your



Internal Grinding Head using a I" wheel for grinding bore in heat treated die.

3 Sizes for Lathes 9" to 60" swing - \$245 up.

MASTER MANUFACTURING 1306 E. AVENUE A • HUTCHINSON, KANS., U.S.A.

# How to get Heavy Duty High Production ...



# NEW AIR-OPERATED SINGLE SPINDLE AUTOMATIC CHUCKING MACHINE

Radically different in design, it is especially suited for heavy duty high production on castings, forgings and tubing parts. You'll find complete information in our new 12-page booklet. Write us on your company letterhead for your copy of bulletin SC-46.

The NATIONAL ACME CO.

Acma-Gridisy Bar and Christing Arbanatics:
1-4-6 and 0 Spindle - Bythraulic Thread
Reiling Muchines - Arbanatic Phreading Dies
and Taps: The Chronology - Limit, Matter Starter
and Control Station Switches - Solomoies
Contributingss - Contract Manuscrytine

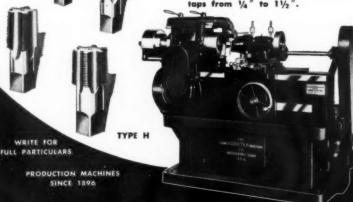


# ... A "REVOLUTION" IN MACHINING INDUSTRY...

TOUGH Threading jobs licked by COULTER TYPE "H" THREAD TAP MILLING MACHINE

NOW...comes a development that extends the capacity of this 'wonder' machine. COULTERS' are made to perform the most delicate threading operation with both speed and accuracy... 40 years of specialized experience, manufacturing precision machines exclusively. The NEW Type "H" is equipped with an overarm tall center and large collet chuck, holding the work rigidly so ONLY ONE REVOLUTION OF THE TAP is necessary.

Any number of FLUTES, eccentric or con-eccentric relief straight or taper can be produced. Pipe taps from  $\frac{1}{4}$ " to  $\frac{1}{2}$ " and straight taps from  $\frac{1}{4}$ " to  $\frac{1}{2}$ ".



The James COULTER Machine Co.

BRIDGEPORT . CONNECTICUT .

U.S.A.



We also represent in the United States other world-famous Swiss High Precision Equipment: Andre Beehler—Maag Geer Wheel Co.— Mikron—Safag—Studer—Sallaz— Schaublin—Lionhard—Billeter.

SIP PROFILE

PROJECTOR AP-10

Close-up shows four-stop turrets containing objectives and condensers providing quick change-over from one magnification to another. Object table, 51/2" x 55/4". Also types AP-II with object table 6½"x8½" and AP-6 with work capacity 7%" x 8".

HIGH PRECISION MACHINE TOOL



AND MEASURING INSTRUMENTS

CHRYSLER BUILDING New York 17, New York

Weld after removing flash

## Flash-Welded Sash Hits New





28

# Aluminum (or Steel)

## **Production High on**

Weld before removing



The manufacture of strong, light-weight metal sash received a great impetus when Federal pioneered development of resistance welders to automatically weld butt or mitre joints of intricate cross sections.

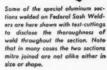
It now takes about one second of welding time to flash a mitre joint stronger than the parent metal on the Federal F4 Flash Welder shown at left. It is typical of present day equipment which is helping fabricators of aluminum sash, frames and doors to attain a new high production output ... speeding production of modern bus bodies, aircraft, featherweight storm sash, and the like. This "four-in-one" machine, equipped with combination cams (a new feature) is adaptable to either aluminum or steel sash, with simple changes of gears and tap settings. In addition, it welds either mitre or but joints. Alternate setups are made simply by rotating the clamp assemblies as shown in the smaller illustrations.

A few of the many special sections now being production welded in aluminum are shown at right. Production rates vary with the cross-section and method of loading, but all are in high out-put range that makes other methods unprofitable by comparison.

This, as the evidence shows, is the modern way to make metal sash of consistently good quality, free from distortion, with rigid unbreakable joints, which finish nicely. It is typical of the short-cutting, cost-saying methods possible in all sorts of metal fabrication with the use of Federal resistance welding. It's time to find out how this applies to YOUR production.

SEE US AT THE METAL SHOW— Atlantic City, Nov. 18-22 NOTE THIS TEST:
THE JOINT BREAK IS IN
HOLDS PARENT METAL.





DANIV

AND WELDER COMPANY

216 DANA STREET .

WARREN, OHIO

# GOING ON" HERE?

WHEN you see the chips smoking out of this job as a Cleveland Automatic hogs into a 6-11/32" forming cut, simultaneously rough boring a 1-15/16" I.D., you may well ask "What's going on" or more appropriately, "What's coming off . . .?"

The answer is that pounds of metal are coming off of high carbon steel bar to make a high quality collet blank in minimum time for Modern Collet and Machine Company of Detroit. They use Clevelands because they have found that something comes off the cost of production too, when a job comes off a Cleveland Automatic. That's important to ANY company which, like Modern, strives to serve industry with dependable parts at the best possible values. Just another confirmation of our point that . . .

Clevelands Cut Costs

#### THE CLEVELAND AUTOMATIC MACHINE CO.

2277 Ashland Road · CLEVELAND 3, OHIO

BRANCHES: Chicago . Detroit . New York . Cincinnati . Hartford

With coolant turned off you can see details of the cut this powerful Medel A 5½" Cleveland Automatic is taking. This happens to be one of Modern's smaller collets, but in making the 3½" size a forming tool 7-15/16" long is mounted on the front cross slide while a 3-15/16" bering har rough bores 1D from a turret station. Still larger parts are made in the same plant on a Cleveland Medel A 2" automatic.



GRINDS DIFFICULT CUTTERS EASILY

#### "THE OLIVER ACE"

gear cutters . . . double angle cut-ters. Fellows helical cutters . . . production gashing . . radial relief grinding . . . and newer uses are found every day.

It is easy to operate . . . simple to set up . . . the ACE keeps the work before the eye with no bending . . . no squatting . . . no squinting . . . saves the operator from work fatique.

"You can cut grinding costs with the ACE.

Write for Illustrated Literature.

OLIVER

Instrument Co.

IMPROVE YOUR TOOLROOM 1408 E. Maumee St. IT'S THE BACKBONE ADRIAN, MICH.

OF PRODUCTION

AUTOMATIC DRILL GRINDERS TOOL & CUTTER GRINDERS - DRILL POINT THINNERS - TEMPLATE TOOL GRINDERS - FACE MILL GRINDERS-DIEMAKING MACHINES

## CUSTOM BUILT AIR CYLINDERS



FENN Custom-Built Air Cylinders eliminate completely the necessity of fitting your designs to standard type cylinders, particularly where space is at a premium. By adopting Fenn Cylinders you may reduce your space requirements for the same power at the same available pressure because Fenn builds them specially to meet the requisites of your designs.

Complete cylinder valve can be furnished as a separate item or as an integral part of the cylinder.

Built to provide accurate control of the piston velocity curve according to your needs, all Fenn Cylinders can be cushioned at either or both ends of the stroke.

Orders accepted in any quantity. Prices only a fraction more than standard cylinders. Inquiries invited regarding your specific problems.

### The **FENN** Manufacturing, Company

HARTFORD . CONNECTICUT.

Dept. G



## Logan

#### A NAME TO REMEMBER WHEN YOU THINK OF BETTER LATHES AND SHAPERS

#### BRIEF LOGAN SHAPER SPECIFICATIONS:

Length of ram travel,  $75\%^\circ$  ... strokes per minute, "Anyspeed," 64 to 175 ... length of bearings, main frame,  $10^\circ$  ... length of ram,  $161\%^\circ$  ... width of ram,  $5^\circ$  ... table traverse,  $101\%^\circ$  ... tobbe vertical travel,  $51\%^\circ$  ... table length,  $8^\circ$  ... table width,  $8^\circ$  ... table depth,  $11\%^\circ$  ... table width,  $8^\circ$  ... table sherp,  $11\%^\circ$  ... table sherp,  $11\%^\circ$  ... toolhead travel,  $11\%^\circ$  ... toolhead swivel,  $11\%^\circ$  ... toolhead diameter,  $11\%^\circ$  ... table switch travel,  $11\%^\circ$  ... Toolhead diameter,  $11\%^\circ$  ... Tools feeds,  $11\%^\circ$  ... Tools feeds,  $11\%^\circ$  ... Tools for so,  $11\%^\circ$  ... Tools for so,  $11\%^\circ$  ... when  $11\%^\circ$  ... Tools for motor,  $11\%^\circ$  ... Thisping weight, shaper, stand and motor,  $11\%^\circ$  is the same standard forms.

#### 7-INCH SHAPER

# The Logan Shaper is built by the same organization which engineers and builds the Logan Lathe. Quickly, easily set up, it handles a wide variety of work, straight cuts, angular cuts, squaring, machining, and slotting operations. All steel and cast iron, with extra weight at vital points, and rugged throughout, the Logan Shaper takes heavier cuts smoothly, with speed and accuracy, and without chatter. Extra heavy cast iron crank plate puts ample power behind every

stroke. Positive, slip-proof operation, even on heavy cuts, further assured by roller

chain drive. Maximum stroke of 75%" and

#### COMBINES EXTRA CAPACITY HEAVIER CUTS AND LASTING ACCURACY

any desired operating speed between 64 and 175 strokes per minute give the Logan Shaper capacity and versatility as well as accuracy. Speed can be changed instantly, without stopping motor or shifting belt. Ram is micro-set by a simple screw adjustment. Six automatic feeds in either direction from .002 to .012, with a half turn of feed handle reversing feed. Tool head may be swiveled and instantly re-set to center by means of tapered locating pins, an exclusive Logan Shaper feature. For full information on the Logan Shaper, see your Logan dealer or write for details. 0-2

LOGAN ENGINEERING CO. CHICAGO 30, ILLINOIS

Have You Checked Up

Have You Checked Up

Recently on Your Carbide

Recently on Your Carbide

Tool Grinding Jobs?



NORTON ABRASIVES

re You Using The Most Suitable

Wheel on Each Grinder?

FROM the Norton line of diamond wheels you can select the most suitable bond for each of your carbide grinding jobs—cutting blanks, sharpening single-point tools, grinding chip breakers, sharpening multi-blade cutters. And there's a complete line of Crystolon wheels, too, for your grinders using silicon curbide wheels.

Norton has always been first in diamond wheels first with resinoid bonded in 1935, first with metal bonded in 1940 and first with vitrified bonded in 1945. There's a definite field for each of these three types—and for Crystolon wheels.

NORTON COMPANY, Worcester 6, Mass.

Distributors in All Principal Cities

W-1068 A

Norton Diamond or Crystolon Wheels are Available for All Makes of Carbide Tool Grinders:

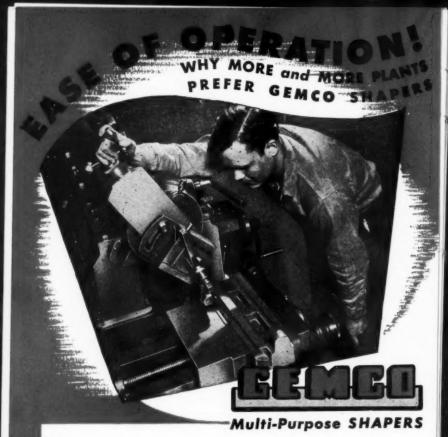
Baldor Blount Norton **Bura-way** Carbolov Criterion Delta Ex-cell-o Hager Hammond Heald Lee Oliver Prosser Sunstrand Willey

Also for All Makes of Tool and Cutter Grinders.

Your Norton abrasive
engineer or your Norton distributor's obrasive specialist will be
glad to help select the
each of your carbide
grinding jobs.

NORTON ABRASIVES

S.M. S. S. S. Sec. 40



es, ease of operation is a good reason why so many plants are enthusiastic about GEMCO Shapers. For one thing, GEMCO'S are easier to get "used to". All controls are within easy reach of the operator. For each operation or machine function, the controls are exactly where they ought to be. Thus, it's easier for the operator to get the feel and to lead the machine through a series of precision operations or to do just rough machining.

You'll find that with a GEMCO Shaper the operator is relieved of many unnecessary motions. And he's less fatigued. You'll be surprised at the amount of work turned out, too.

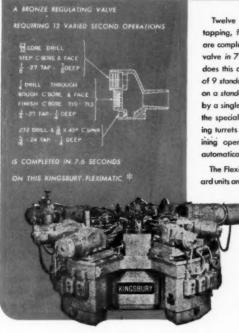
Other time-tested GEMCO features: Exclusive "Lubrigard" Safety Device increases the precision life-Wide range of feeds and speeds-Rugged construction, for rigidity and accuracy.

WRITE TODAY FOR BULLETIN GC 12 B

ENGINEERING & MFG. CO

### 7.6 secs.

### ... for 12 varied SECOND OPERATIONS



Twelve machining operations, including drilling, tapping, facing, counterboring, and countersinking, are completed on the illustrated bronze regulating valve in 7.6 seconds. The Kingsbury Fleximatic that does this complex, high production job is made up of 9 standard Kingsbury metal-cutting units mounted on a standard Kingsbury base. The Fleximatic is run by a single operator. He merely loads and unloads the special work holders of the automatically indexing turrets as they appear at his station. The machining operations are performed successively and automatically as the turret indexes.

The Fleximatic method is based on the use of standard units and modern engineering skill. Kingsbury ex-

perts study the production problem, then assemble the units in the most practical manner to produce at the most efficient rate. Such combined machining operations result in greater production and lower unit costs. And, the first cost is much lower than the usual special-purpose machine.

Do you have a production problem involving multiple machining operations? Send drawings and production data. Let our engineers suggest a profitable solution.

WE PUT OUR HEADS TOGETHER TO CUT YOUR DRILLING COSTS



### **KINGSBURY**

MACHINE TOOL CORP. KEENE, NEW HAMPSHIRE

Write for Bullatin M

#### KINGSBURY FLEXIMATIC

— a special perpass mechine for combined automatic operations during a shaple checking —the result of Kingsbury engineering chilling in the use of law cost standard Kingsbury driffing and topping -heads on standard Kingsbury bases.

### SURFACE GRINDER



This modern, automatic feed surface grinder has ample work ability to meet the heavy production schedules of competitive manufacturing. Its smooth action and per fect control count today where exceptional accuracy, fine finish and high production are essential. Write for Bulletin.



ABRASIVE MACHINE TOOL CO.

BAST PROVIDENCE 14, RHODE ISLAND

Dealers in Principal Civies



#### LYING DOWN ON THE JOB THREE CENTURIES AGO

It was really a grind to produce knives and tools in this 17th century shop. The comfort of the machine operator was of no consequence and production was a creaking, time-consuming process.



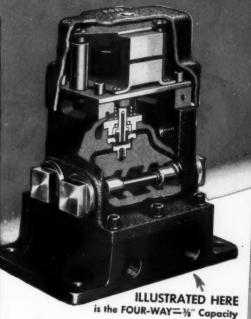
The Government Machine Tool Surplus Lists may include ABRASIVE Machines to replace your obsolete machiners. Send us the machine serial number for any desired information; we will endeavor to provide attachments, accessories and epist patra as required.

### The air Valve You Have Been Looking For PILOT OPERATED · SOLENOID CONTROLLED A New ROSS Piston Poppet Type Valvet

- FAST OPERATING as high as 400 cycles per minute.
- LARGE ORIFICE AREA results in fast exhaust, minimum restriction to air flow.
- POSITIVE SEAL by line pressure.
- SIMPLICITY OF DESIGN removing end plugs permits replacement of piston poppet assembly - no need to disturb piping or to move valve from position-no "down time".
- **ECONOMICAL TO OPERATE** current consumption 1.2 amps. at 110 volts-60 cycle.
- LONG SERVICE ASSURED many Ross valves installed more than 20 years ago are still in active service.
- SMALL AND COMPACT appreciated where space is limited.
- **ALL PARTS** non-corrosive metals.
- **ACCURATELY MACHINED** and all parts interchangeable.

A TYPE AND SIZE FOR EVERY PURPOSE

OVER 100 DIFFERENT MODELS

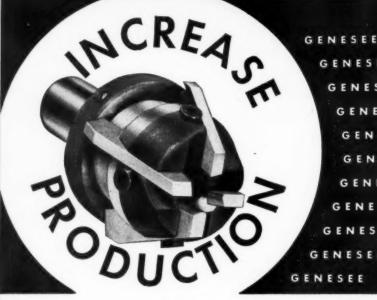


Available in:-

- THREE-WAY normally open, or normally closed
  - FOUR-WAY and
  - FOUR-WAY, Five port. may be had in ¼", ¾", ½" and ¾" pipe size

ROSS Operating VALVE CO.

BRIDLE FOR AIR HORSEPOWER



GENESEE GENESEE GENESEE GENESEE GENESEE GENESEE GENESEE GENESEE GENESEE

### HOLLOW MILLS **ADJUSTABLE**



Other Genesee tools that will increase production.

> Inserted Blade FACING AND COUNTERBORING TOOLS

SPECIAL PRODUCTION TOOLS

There is a Genesee for every hollow milling job. Available in 16 styles. Standard sizes from 0 to 2", with straight or Morse taper shanks carried in stock . . .

- · Each size tool has 1/2 range.
- · Blades quickly ground in a simple fixture.
- All tools manufactured of heat-treated alloy steel. .
- Adjusting threads are ground

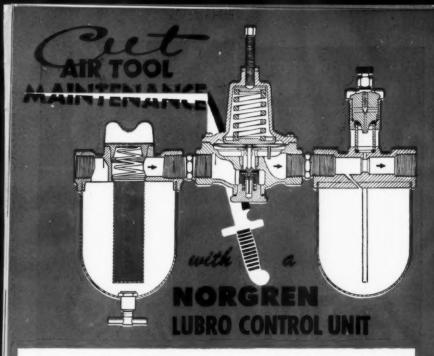
from the solid and adjusting rings are lapped for extreme accuracy.

· Furnished with high speed steel, cast-alloy, or Tungsten Carbide tipped blades.

Let our Engineering Department solve your Production Tool problems."

Write for catalog 45H.

ADJUSTABLE HOLLOW MILLS . FACING AND COUNTERBORING TOOLS . SPECIAL PRODUCTION TOOLS



Clean, control and lubricate the air that drives the tool with this precision built assembly of filter, regulator and lubricator. Filter stops rust and pipe scale; catches corrosive oil emulsion and moisture. Regulator levels out surges and pressure drops. Lubricator automatically injects clean oil into the airstream, creating an oil-air fog. Coats ALL vital parts with protective film of oil. Lubricates while tool works. Protects while tool is idle.

Stop excessive wear in air driven tools, cylinders, valves, chucks, etc. Investigate Norgren Lubro-Control Unit today.

Write for Catalog No. 400

C. A. Norgren Co., 220 Santa Fe Drive, Denver 9, Colorado.

Morgren

### THE HEVI DUTY

(AN ALL PURPOSE FURNACE)

ZONE CONTROLLED, UNIFORM, PRECISION CARBURIZING



### For NITRIDING

A HIGHEY UNIFORM CASE WITH

HEVIDUTY

### For BRIGHT

OF FERROUS AND



### For CLEAN HARDENING

HARDENING SPECIFICATIONS

SEND FOR BULLETIN HD142

### HEVI DUTY ELECTRIC COMPANY

MEAT TREATING FURNACES HET HEDDET SLECTRIC EXCLUSIVELY MILWAUKER, WISCONSIN

Rand RIGHT---



### LEFT in 10 Seconds...

with R and L Turning TOOLS Production savings are important in post-war work. Here is a tool that will save time and money in your shop.

R and L tools increase production by reducing set-up time, by speeding authing operations, by doing right and left hand turning and by performing several operations simultaneously.

One R and L Turning Tool takes the place of an assortment of 14 separate tools costing 4 times as much! R and L are made in five different sizes . . . and delivery can be made from stock.

Let us send booklet describing R and L Tap and Die Holder, Roller Backrest and Universal Tool Post.

### RAND L TOOLS

1825 BRISTOL ST., NICETOWN, PHILADELPHIA 40, PA.

### The SUPER METHOD



### of TRIMMING FORMED PARTS and performing a host of other metal cutting jobs!

The negligible down-drag and the ability of Tannewitz High Speed Band Saws to cut sheet metal from 90° to near 0 or 135° at tremendous speed make these machines ideal for trimming. Cuts can be made with perfect safety without using a rest of any kind.

Friction sawing with Tannewitz High Speed Band Saws also results in perfectly

amazing time savings in the cutting of flat sheets, soft or hardened steels, armor plate, plastics, glass and many other materials. Whatever your cutting problem, chances are it can be done better and faster with Tannewitz Band Saws. Investigate this "Super" method of cutting.

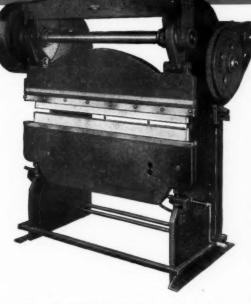


Tannewitz

Write for Your Free Copy HIGH SPEED BAND SAWS

THE TANNEWITZ WORKS 4, MICHIGAN

# Powerful CHICAGO STEEL PRESS BRAKE



TYPE "300"

A POWERFUL, rugged, inexpensive Press Brake, designed and built to the standards of Chicago Steel Forming Presses.

This money-saving production tool will handle 40 to 50 percent of the work done in an average shop. Greater speed, higher efficiency—much lower operating cost—plus the highest quality material and sturdy steel welded construction as in our larger machines.

-3 sizes — capacities 10 dage, 4 ft. long; 12 gage, 5 ft. long; 14 gage, 6 ft. long. Powered by  $1\frac{1}{2}$  h. p. motor.

We also build special machines for intricate bending operations.

Take advantage of our experience of over 45

Take advantage of our experience of over 45 years by sending to us any difficult bending problem you have.

WORLD'S LARGEST MANUFACTURER OF HAND BENDING,
POWER RENDING AND FOWER PRESS BRAKES

DREIS & KRUMP MANUFACTURING CO.
7440 LOOMIS BLVD. - CHICAGO 36, ILLINOIS
SEND FOR NEW BOOK "FORMING PRESS DIES AND THEIR USES"

### If You Use MAGNETIC CHUCKS-

These modern aids assure maximum chuck performance.

The ELECTRO-MATIC line of industrial rectifiers is designed for heavy duty service. The sturdy d-c current supply units are engineered to "stand up" day after day in the hardest usage. During the present shortage of small motor-generators, these efficient and dependable rectifiers are being used for many other industrial d-c applications.

NEU-T-ROL is the efficient modern method of releasing work pieces from magnetic chucksand demagnetizing work pieces

as they are released.

NEU-T-ROL saves time and tempers - eliminates marred. distorted workpieces and prevents damaging of chuck faces. NEU-T-ROL also protects chucks against harmful voltage surges.

NEU-T-ROL is fully automatic in operation, being scientifically time controlled. No human factors, such as delicate timing enter into its successful perform-

ance.

NEU-T-ROL chuck controls and ELECTRO-MATIC rectifiers can be installed easily on equipment already in use-or built into new machines before delivery, if you so specify.

Let us send bulletins giving full information — no obligation.

ELECTRO-MATIC PRODUCTS CO. 2235 North Knox Ave., Chicago 39, Illinois

### **ELECTRO-MATIC** Industrial

Rectifiers

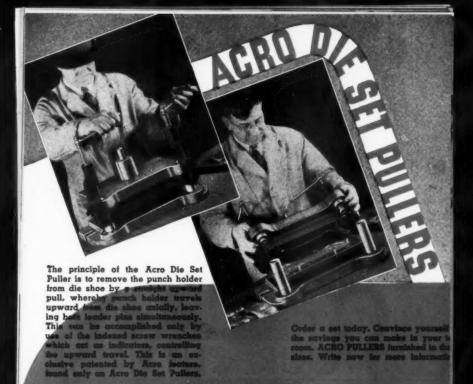


These sturdy, dependable industrial rectifiers are available in 42 models in capacities ranging from 125 to 3,000 watts.

NEU-T-ROL is built for any size of magnetic chuck, being made in two types - manual control for small size chucks and motor operated for remote control.



NEU-T-ROL Magnetic Chuck Controls

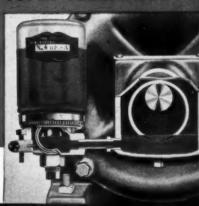


Dual visibility — Sight gions on side of labricator boad on exclusive SUPER feature, shows a fact oil level maintained in bearing plus oil supply in reservoir, sliminating quess work.

There is no drippage, no waste, no over flow, Oil is automatically fed to the bearings as required.

Nationally known authorities estimate hat 75 per cent of all machinery repairs are caused by inefficient and improper labeleation, and that 85 per cent of the all bounds for indirecting purposes in never used by the bearing surface for which it was intended. WRITE FOR LITERATURE.

### SUPER LUBRICATOR.



ACRO

PROMPT

METAL STAMPING COMPANY: 332 E. RESERVOIR AVENUI

### Specify ATLANTIC

BAND SAW BLADES

Smoother



### CONTOUR CUTTING

ATLANTIC SAWS meet all of your requirements for a superior blade on complicated die and fixture radius cutting. ATLANTIC specializes in accurate milled and precision set teeth, hardened to exact temper.



Atlantic's strong, practical box, plainly marked on sides and top. Remains in good condition until entire coil is used. ATLANTIC'S special alloy steel insures longer wear and easier welding. ATLANTIC'S one temper saw for all metals reduces stock you have to carry. Cut to length and welded, ready for use. Packed in strong Atlantic box. Write for new Atlantic Catalog.

Atlantic Saw Mfg. Co.

Exclusively Manufacturers of Band Saw Blades
153 Brewery St., New Haven, Conn.

### GRENBY HYDRAULIC GRINDING MACHINES

### **FEATURES**

- Infinitely Variable Longitudinal Traverse
- Hydraulic Cross Feed
- Coolant
- Precision Spindles
- · Heads Swivel For Angle Work
- Grinding Heads To Convert
   For Internal Grinding (See Cut)

### **EG103 SPECIFICATIONS**

Work Capacity—3" Dia. x 10" Length Workhead Accommodates—Collets 1" Max. Hole —Chucks & Face Plates 4" Max. Floor Space & Wt. 45" Long x 25 Wide—1600 lbs.

THE
GRENBY MANUFACTURING
COMPANY

PLAINVILLE, CONNECTICUT



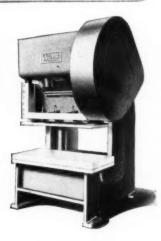
### Engineered for Greater Strength, Rigidity, Accuracy, Power and Endurance



WELDED STEEL . . . fully stress-relieved

### DOUBLE CRANK GAP PRESS

Capacity 100 to 500 tons, for handling large diameter stock. Gap rigidly reinforced to minimize "spring action" from heavy loads.



### How Added Life Is Built Into Warco Presses

 Warco welded steel frames are annealed to prevent locked up stress and to remove danger of misalignment from overload. Stressrelieving adds years to press life and provides unchanging rigidity, strength, accuracy and endurance.

Extensive production facilities enable us to handle orders promptly. Let a Warco engineer help solve your press problem.

We extend an invitation to visit our modern factory at any time.

WARREN CITY MANUFACTURING COMPANY

1948 Griswold Street • WARREN, OHIO
A Subsidiary of The Federal Machine and Welder Company

A Subsidiary of The Federal Machine and Welder Companion Offices in Principal Cities

ECCENTRIC GEAR PRESSES . OBI PRESSES

HYDRAULIC PRESSES . PRESS BRAKES

### Let the chips fall where they may!

Even in the best regulated plants, chips have been known to fall, liquids to drip and particles to drop. It makes no difference to this great new Delco general-purpose motor. The top half is completely enclosed—the interior completely protected against just such occurrences.

Outside and inside, this motor is really new. Its better ventilation

and insulation, simpler maintenance requirements and all-round greater efficiency reflect some very significant General Motors research in materials and methods. And it's really a general-purpose motor, too—with varied torque and starting specifications to meet a wide range of industrial applications. Complete data and delivery schedules on request.





### Check These Advantages — You get Them ALL In UPPCOLLOY REVERSIBLE Plug Gages

NON-FERROUS ALLOY with 20 times the life of the best steel.

TOUGHNESS — made to stand continuous hard use. No chipping.

NON-CORROSIVE — Rust proof. No rusting in storage or in handling.

NON-MAGNETIC — Will not pick up chips that might injure work.

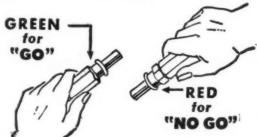
HANDLES are marked plainly and are easy to grip and use.

**TAMPER PROOF** — Handles are equipped with a special drift for removing plugs. This drift is kept in Inspection Department where only changes may be made.

**REVERSIBLE** — This feature gives two "Go's" and two "No Go's" in one gage handle. Either can be reversed when worn and you have an accurate gage.

### COLORED PLASTIC COLLETS

Color identifies plug instantly. Weight is reduced. Secure locking — no slipping. No marring or scratching of plugs as with metal collets.



### UNITED PRECISION PRODUCTS

3522 WEST BELMONT AVENUE, CHICAGO 18, ILLINOIS



SPEEDS PRODUCTION . Skills and the second of the second second was seen as the second second was seen as the second second

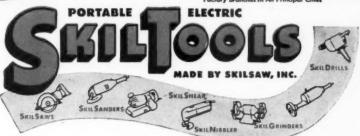
### SPEEDS MAINTENANCE ... SKILSAN rips up old flooring, removes morter before bed pointing, carws replacement lumber 10 times total floor by band ... series maps/



### SPEEDS NEW BUILDING...SKILSAI makes every cel in construction fester, better sussier... serves time on every step from four

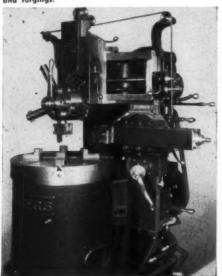


SKILSAW, INC., 5033-43 Elston Avenue, Chicago 30, III.
Factory Branches in All Principal Cities



# How to turn your old machine tools old machine tools INTO BRAND NEW INTO BRAND NEW OGERS "Perfect 36" VERTICAL TURRET MILLS by

Check with Rogers before buying equipment to bore, drill, turn or thread ferrous and non-ferrous castings and forgings.



### TAKING ADVANTAGE OF THE ROGERS TRADE-IN PLAN

Rogers exclusive arrangement with one of America's leading machine tool dealers now makes it possible for you to trade in your old, wornout equipment on new Rogers Mills. Trading your old equipment for new Rogers Mills is just as easy as trading your car.

Your cash outlay is at a minimum when modernizing your plant facilities by taking advantage of new Rogers Mills and Trade-in Plan.

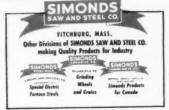
Call, wire or write for complete information on Rogers Trade-in Plan and Rogers "Perfect 36" Vertical Turret Mills.

Rogers Machine Works, Inc.
SALES OFFICE: 1813 ELMWOOD AVE.
BUFFALO 7, N. Y.
FACTORY: ALFRED, N. Y.

# SIMONDS Red To they keep your File-Costs down RED TANG FILES have the same basic tooth-design as Simonds Metal-Cutting Saws. So Red Tangs cut, instead

of scrape . . . remove more metal with less elbow-grease. That's why workers like them. And bere's why YOU will like them: They last longer . . . and deliver more and better work per file-dollar. Order Simonds Red Tang Files from your Industrial Supply Distributor, or from the nearest Simonds office listed below.

BRANCH OFFICES: BRANCH OFFICES: 1350 Columbia Road, Boston 27, Mass; 127 S. Green St., Chicago 7, Ill.; 416 W. Eighth St., Los Angeles 14, Calif.; 228 First St., San Francisco 5, Calif.; 311 S. W. First Ave. Phuland 4, Archus Spotane 8, Washington; Canadian Factory: 55 St. Remi St., Montreal 30, Que.



## TOOLS PRECISION PRODUCTION

### UNIVERSAL

### TOOL HOLDER

Handles any and all lathe operations. Also for planer, shaper and special equipment.

#### **NEW EFFICIENCY FEATURES**

- Does the work of 10 different toolholders—at a fraction of the cost.
- Locking Device has greater rigidity and positive locking. Can be locked in either right or left hand position.
- New Cam Design provides for increased rigidity of the tool bit. Retaining rings provide for easy removal of Cam for cleaning, oiling or replacement.
- Bit and Holder are always parallel.
  - Quick change bit tightening device. (See "A".)
  - 100% interchangeability of parts.
  - High quality ground square Bit and Square Box Wrench furnished with each tool.

#### SIZES

Holder	No.		Holder Size			Bit Size		
00	76	×	3/4	X	51/2	3/4	×	21/2
0	3%	x	3/4	x	51/2	5/16		
1	1/2	×	1%	x	61/8	3/4	×	3
2	5%	×	1%	x	7	7/16	×	31/2

EXTRA LONG BITS and ROUND BOR-ING BARS AND THREADING TOOLS are available for use in the same toolholder.



#### **ROTARY TABLES**

UNIVERSAL—With the exception of Model BH-9, all tables are so designed that a dividing attachment may be purchased at any time after table is in me. THROWOUT WORM—May be discharged easily the sound of throw it out of advantage of the state of the state



Rotary table may be used for work on milling machines, shapers, drill presses and horizontal boring mills.

PROMPT DELIVERY — Write for Literature

ACME TOOL COMPANY

96 WARREN STREET - .

NEW YORK 7. N. Y.

### The Hartford SPACER





UNEXCELLED ON ACCURATE INDEXING OPERATIONS

able for milling, drilling, grinding, jig boring and slotting. It is a versatile production aid of exceptional value in accurate indexing operations - - with feeds and speeds limited only by the capacity of the holding means and power of the machine.

Write today for full details.

HARTFORD SPECIAL MACHINERY COMPANY HARTFORD (5) CONN.



manufacture of precision carbide tools and gages. This accumulated knowledge of carbide fabrication and proper application, plus unsurpassed production facilities, has now been applied to the building of carbide dies.

The dies illustrated, one for progressively piercing and blanking small motor laminations of silicon steel, the other for blanking and inserting paper liners in jar closures, are two examples of the carbide dies produced to date.

If you are considering the use of carbide dies — consider our experience and facilities. We will be pleased to submit quotations.



### THERE ARE 7 FACTORS

### TO CONSIDER WHEN YOU BUY GAGES

. . DESIGN Better design makes a gage easier and faster to use. VARD gages incorporate the best of the postwar gage design engineering.

#### . MATERIAL

A well designed gage is a good buy when its basic material fully meets use requirements. VARD gages are made of Timken Graph-Ma steel, hard chrome plate or Norbide (Norten Company's beren carbide).

#### . . GRINDING

VARD gages are shaped on batteries of modern grinding machines - in temperature controlled rooms by expert gagemakers. Are ACCURATELY ground.

#### . . INSPECTION

Microscopic inspection equipment is necessary for gage testing. VARD owns visual and mechanical testing equipment of all types, reading to .000001-inch accuracy.

#### . . PACKAGING

A gage properly made must still be safely delivered into your hands. VARD gages are wrapped in shock-resisting packing and then sealed in individual boxes. Small gages are sealed in plastic tubes.

#### . . AVAILABILITY

VARD stocks most sizes of standard thread and dimensional gage. Our dealers also '¢0h supply you. Special gages are 60w produced in record time,

#### . . SERVICE GUARANTY

**VARD** guarantees its products against all defects of materials or workmanship. Moreover, VARD can rebuild or renew your worn gages.

Write for the VARD Gage Catalog -Ask for data on gages you need.

Gagemakers

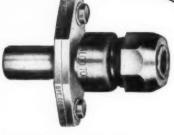
RD INC. 2981 EAST COLORADO STREET PASADENA 8, CALIF., U.S.A.

### Releasing Model Tap and Die Holders

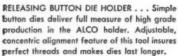
HAND SCREW MACHINES

### ALCO

for TURRET LATHES



RELEASING TAP HOLDER...Holds taps securely by direct application of pressure in jaws — NO BUSHINGS NEEDED. Full floating flanges set taps absolutely concentric with hole. Result: Even wear on all leads of tap, no tap breakage, perfect threads.







RELEASING ACORN DIE HOLDER . . . The only acorn type releasing model with adjustable concentric alignment. Quick and positive set-up. Chip elimination and effective lubrication through adequate openings. Rigid drive mechanism — no pins used.

### ALCCTOOLS

THE ALCO TOOL CO., 252 Birdseye St., Bridgeport, Conn. Detroit Office: 2441 Field Ave. Phone DIXson 2434 Chicago Office: 608 So. Dearborn St. Phone Webster 2868

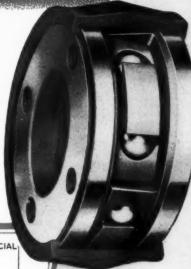
# Anti-Friction Flexible Coupling

allflex provides flexibility—both angular and axial—by e rolling motion of hardened steel balls, insuring distinct dvantages in performance as well as long life for both pupling and mounting bearings.

ne load necessary to flex rubber and fibre discs or move ding members—equalled by the reaction on mounting earings—is one of the reasons for bearing and coupling silure, with subsequent down time.

allflex has no rubber or fibre discs—no sliding members. ne only flexible element is the synthetic product used in the verall seal that retains the factory packed lubricant and seps out dust, dirt and liquids, and is impervious to oil.

'ee rolling movement in any direction eliminates side thrust nd the bending or springing of parts. It accommodates parlel misalignment up to 1/2" and/or angularity up to 3°.



Baltiflex requires no lubrication! It is packed with lubricant at the factory, for the life of the unit, and sealed.

### Compact - Easy to Install

Salfflex is installed between two keyed flanges, spaced 136" apart for correct working clearances. Installation or removal accomplished without removing flanges or shafts.

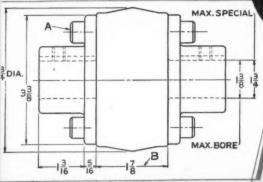
#### WRITE FOR LITERATURE

Contains full information and gives capacity ratings.

Manufacturers of FORMSPRÄG—full complement over-running clutches

RZEPPA constant velocity universal joints.

MACHINES for the Formed Wheel Grinding of gears, racks, splines and serrotions.



EAR GRINDING
MACHINE COMPANY
MACHINE COMPANY
MACHINE COMPANY
MACHINE COMPANY
MACHINE COMPANY
MACHINE COMPANY

### SHAVE "Per Piece" COSTS



a wide range of uses - including drilling. counterboring, spotfacing, threading and many other operations. New DOUBLE BED CLAMP prevents crawling under heavy cuts . . . Unique DOUBLE DRIVE assures quick, easy slide movement. Only ENCO offers as many features. Adapt every bench lathe in your shop to a DUAL PURPOSE, DUAL PRODUC-TION machine. Write today for complete details.

CONSTANT ACCURACY

#### ENCO'S "DOUBLE-DRIVE" PRINCIPLE



Push a block with one finger. Pressure on an edge pushes the block to one side. The same is true with a single drive and one gib . . . friction and wear are creat-

ed. Enco's double drive equalizes power and prevents uneven wear.

Department 18

#### MANUFACTURING COMPANY

GENERAL OFFICE AND FACTORY: 4522-24 FULLERTON AVE., DEPT. 18, CHICAGO 39, ILL.

EXPORT DIVISION: ENGINEERING BUILDING

205 W. Wacker Drive



### from coast to coast for your convenience

BUCKEYE'S 1088 SIZES of fully finished readyto-use bearings,—156 sizes of semi-finished cored bars turned on the O D only, and 256 sizes of rough cast bars are regularly stocked in the leading industrial markets for your convenience.

Manufactured from selected materials under Buckeye's rigid controls, these bearings measure up fully to Buckeye's exacting specifications. Each is a quality product, free from porosity, and accurately dimensioned, assuring speedy, easy assembly and long efficient service. Send for the Buckeye at alog and order Buckeye Bearings by name from the Buckeye distributors.

RADGER BALL & ROLLER DEARING - MOVEMBRE, WIL RADGER BEARING COMPANY .... Chicage, Minor BOOKER BEARING COMPANY . . . I JOYSOY CITY, N. J. BODIER BEARING COMPANY .... Howard, N. J. BURRANS & BLACK IMC. . . . . . . Syracese, N. Y. CANADIAN BEARING SUPPLY INC. - Hamiton, Ont., Con. CARTER, MILCOMAN & FRANK INC. - NOW YOR, N. T. CROSS BROS. COMPANY, INC. . . Bechester, M. Y. CUTTER, WOOD & SANDERSON CO. - Combridge, Mass. A. H. LEU SALES CO. . . . . . St. Louis, Mr. A. B. LED DIEGO DE COMPANY - Bridgoport, Come. PITISBURGH ENE. & SUPPLY GO. . . Pittsburgh, Pa. S. N. POOLEY BELTING COMPANY . . . Buffalo, N. Y. SLATSHAN COMPANY .... Baltimore, Mc. SMITH-COURTNEY COMPANY .... Richmond, Va. STRONG, CARLISLE & HAMMOND CO. - Claratand, Obio R. R. STREET & COMPANY, INC. . . Chicago Illinois TRISTATE CORPORATION .... Philadelphia Pa

### Buckeye

BRASS AND MANUFACTURING COMPANY

6412 HAWTHORNE AVE.



CLEVELAND 3, OHIO

BRONZE SLEEVE BEARINGS . STANDARD SIZES OR TO CUSTOMERS' BLUEPRINT

IN ANY RECOGNIZED BEARING METAL ANALYSIS



D. H. PRUTTON MACHINE & TOOL CO.

5295 W. 130th St

CLEVELAND 11. OHIO

There are Six

in this Picture

Thor

PNEUMATIC ASSEMBLY TOOLS

Drive Screws, Set Nuts, Three Times Faster Than Hand Tools

The picture shows this girl's two hands operating a Thor 217 Pneumatic Screwdriver.

But, if you could watch the job you would see in the speed with which this girl completes assemblies a ratio of "six hidden hands" inside that Thor tool which help her assemble faster . . . surer than any three operators using hand tools.

NO HUMAN HAND can approach the unfailing accuracy, precision and speed with



which Thor pneumatic assembly tools drive screws and nuts. On most models, an adjustable clutch controls precisely the tightening of the fastener to the exact tension required. Write or call your nearest Thor branch today.

#### INDEPENDENT PNEUMATIC TOOL CG. 600 W. Jackson Blvd., Chicago 6, Illinois

BIRMINGHAM BOSTON BUFFALO CLEVELAND DETROIT LOS ANGELES MILWAUKEE MEW YORK PHILADELPHIA PITTSBURGH ST. LOUIS SALT LAKE CITY SAN FRANCISCO TORONTO, CANADA LONDON, ENGLAND



PNEUMATIC TOOLS • UNIVERSAL AND HIGH FREQUENCY

### double duty

most satisfactory

We purchased them for our production. Now our Sentry High Speed Steel Hardening Furnaces are doing profitable outside work in addition - because they are doing such an outstanding job.

100% for

Several owners of Sentry Model "Y" Furnaces have enthusiastically told us this story. Too, they praise Sentry Diamond Blocks for maintaining the correct atmosphere to produce clean, scale-free, true-to-size high speed steel hardening.

Sentry Furnaces waste no time in getting up to heat - waste no fuel give off no fumes. Produce large quantities of uniformly heat treated work, quickly. Sentrys are especially adapted for all, molybdenum, tungsten, cobalt high speed, and high carbon high chrome steels.

Sizes and capacities to meet your requirements.







Send for bulletin 1055-1D9

The Sentry Company FOXBORO, MASS., U.S.A.



### SETS NUTS AT HALF THE COST

NUT-SETTING with socket wrenches consumed a lot of man-hours for this manufacturer of vacuum cleaners. He called in the Rotor Application Engineer for suggestions to simplify nut-setting and screwdriving operations. Result: he installed Rotor M-851, 1000 R.P.M. midget Nut Setter with X-11 Double Adjustable Clutch.

Cuts Cost 50%. Nut-setting is now an easy, onehanded job-more than twice as fast as formerly. Tool weighs less than 2 lbs. **Uniform Tightening.** Rotor Adjustable Clutch permits setting of nuts to any desired tension... every operation uniform.

The Rotor Application Engineer will be glad to study your portable tool operations to help cut your costs.

Yours for faster production,

AIR O'TOOL

THE ROTOR TOOL CO

CLEVELAND OHIO

Unbiased analysis of Portable tool problem.

### **IDEAL SPEED LATHES**

For accurate, uniform, speedy finishing of metal & plastic parts.







#### POLISH . LAP . DE-BURR . FINISH

NA1B (above)—for general finishing of gears, pulleys, dies, and other large pieces—metal or plastic.

NA1E - foot-operated collet type, for high-production finishing of many identical small parts.

NA1C - with hand- or foot-operated collet, to take up to 1" round stock.

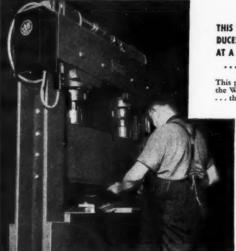
VA1B - variable speed lathes, in bench and pedestal models, chuck and collet types.

If you have a finishing problem WRITE FOR CATALOG 440

CHAUER MACHINE

ORIGINATORS OF TODAY'S SPEED LATHES
2064 READING ROAD ...... CINCINNATI 2. OHIO

### More Profitable than Politics or Stamping Silver Dollars



- K. R. Wilson

THIS 100-TON KRW HYDRAULIC PRESS BRAKE PRO-DUCES JAMB SECTIONS FOR 2,000 WINDOWS A DAY AT A FRACTION OF THE COST OF HEAVIER EQUIPMENT ...HOLDS WORKER FATIGUE TO A MINIMUM

This press had been in operation only a few days before the Wendling Iron Works of Buffalo ordered three more ... that's how satisfactory it proved in use. Now it is

turning out 4,000 jamb sections, for 2,000 windows (illustrated below), in two 8-hour shifts a day. No longer is it necessary to buy tons of unnecessary weight in a press in order to get efficient production. KRW welded construction plus scientific distribution of stress and load has radically changed all that. This 100-ton KRW press weights a fraction, and costs a fraction of comparable equipment.

Because this press is hydraulically operated and not mechanically driven, it is quiet and almost vibrationless in operation. The press cannot be jammed by careless operation the platen can be stopped and reversed at any point in its travel. Two heavy-duty cylinders develop controlled pressure to perform the work. Pressure is perfectly equalized between

these cylinders by the exclusive KRW mechanical linkage and torque bar arrangement. Pump equipment varies depending upon customer requirements. This press can be engineered as a gap type or with open or closed ends. Write for details, or better still, tell us what you want to accomplish and we'll quote you specifically. Mail the coupon.

#### DIES QUICK DELIVERY TO YOUR SPECIFICATIONS

We have arranged dependable connections for the manufacture of all types of dies for K.R.W. Press Brakes. Send us your blueprints and specfications for accurate costs and delivery date.

# NAME YOUR NEEDS

### QUIET

#### IT WOULDN'T WAKE A BABY

Easy, even hydraulic pressure does the work. No jarring impact as the die bottoms. No shock to the worker to Jessen efficiency.

### **VIBRATIONLESS**

#### GLASS OF WATER ON THE PLATEN, YOU'LL NEVER SPILL A DROP

That's how evenly pressures are distributed over the unit. That too, is another reason why dies last longer in a KRW.

### DEFLECTION NIL

### NO SWAYBACK PLATENS TO WORRY ABOUT

Where pressures require it, bed rails, platens and head are trussed and ribbed to eliminate any deflection. Press illustrated stamps three jambs per stroke.

### Specifications

#### KRW 100-TON PRESS BRAKE

40 Strokes per minute Floor Space Req. Incl. Power

Weight Incl. Power Plant....5,500 lbs.

Ram Pressure 100 tens Automatically Controlled Step

pending on your needs.

Can be made as gap type, or with open or closed ends. Distance between uprights and length of platens can be increased or decreased, de-

> 4,000 jamb sections, 2,000 windows a day. That's production. Jamb is formed in two operations, first operation shows at left.



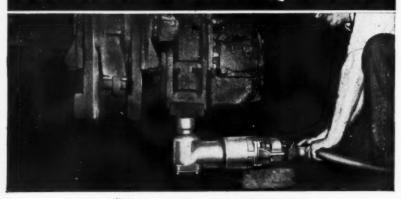
г		_				_				
	K.	R.	WILSON,	215	Main	St.,	Buffalo	3,	N. 1	Y.

Brake.	give	me	the	facts	regarding	the	KRW	100-ton	Press
Name					*********	*****		******	********
Address	pope		*****					*********	******

Capacity and size needed ... ..

K. R. WILSON

### For Work in Close Quarters







### CP Pneumatic Angle Wrenches are big time-savers

Chicago Pneumatic offers the world's largest line of Pneumatic Wrenches (Impact Type). It is the only manufacturer of angle-type Pneumatic Wrenches for applying or removing nuts, bolts and studs in hard-to-reach locations. Models 337 and 344 are also

furnished with 45 degree angle heads for the extra hard places to reach. CP Pneumatic Wrenches (Impact Type) run on or back off nuts, bolts and studs in a fraction of the time required by hand wrenches. Write today for complete information.

\*\*\*\*\*\*\*
PNEUMATIC TOOLS
ELECTRIC TOOLS
HYDRAULIC TOOLS
ROCK DRILLS

CHICAGO PNEUMATIC

本文文文文文文文文 AIR COMPRESSORS VACUUM PUMPS DIESEL ENGINES AVIATION ACCESSORIES

# ENGINEERED

Live Centers

Standard shanks with Morse tapers carried in stock send us your specifications and blueprints we will see that your jab is set up with the right LIVE CENTER

- GREASE SEAL

LARGE THRUST BEARING

LARGE RADIAL BEARING

- CUSHION ACTION

GROUND TRUE with BEARINGS-REPLACEABLE ALLOY STEEL POINT

# STURDIMATIC

5223 THIRD AVE. . DETROIT, 2 MICH.

# The Wade No. 8-A Toolmaker's Lathe Guarantees highest returns on your investment...because

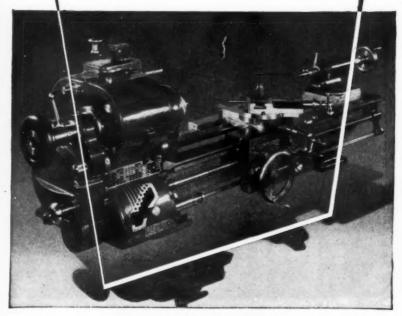
We guarantee that the Wade No. 8-A Toolmaker's Lathe will out-produce and outperform any make of lathe within its size and capacity!

We back up this guarantee with such 8-A features as instant reversing instant Hi-Lo speeds (3:1 ratio)—vibrationless operation—highest speeds enduring accuracy—finest finish—most advanced spindle bearing design—a complete line of tools and accessories for utmost versatility. For the complete story and detailed specifications, write for catalog.



The Wade Tool Co.

WALTHAM 54, MASS.

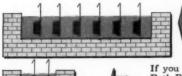


# HOW TO HEAT TREAT A WADGET\* AT LOWEST COST



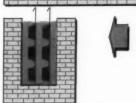
To protect the surface, avoid distortion, eliminate decarburization, a salt bath furnace will, of course, be used.





If you get a conventional salt bath furnace it looks somewhat like this . . . and the Wadgets are placed like this.

Note the surface area exposed.†



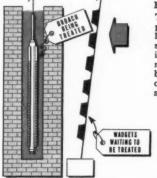
If you have an *Upton* Electric Salt Bath Furnace it would probably look like this . . . with the Wadgets being placed like this.

Note surface area exposed.†

Surface radiation losses equal
 15 KW per sq. ft. per hour.

However, if you also wanted to treat a broach or some similar long piece of work, then you could use an Upton Furnace that looked like this.

This saves more heat (and more power), does equally good work, takes less time loading and unloading, but some people think it won't work; that it's too deep. So, until they do realize that Upton Furnaces can be built to take any length work, the other furnace (No. 2) is usually supplied.



\* Wadget: A piece of work that you are wondering how to treat for better results and at lower cost than at present which will eventually be heat treated in an Upton Electric Salt Bath Furnace because there is no known size or shape that cannot conceivably be treated in an Upton Electric Salt Bath Furnace.

Why don't you send for more information on Upton Furnaces? Send us the dimensions of your Wadgets.

Upton ELECTRIC FURNACE DIV.

# you Wouldn't ....?



A Cut Thread Tap for close precision threaded holes?

Carbon Steel Taps for tapping moulded plastics?

Attempt to tap tough, cold worked metals dry?

These and many other questions much more complex are being answered every day by Winter Brothers engineers. 46 years in the thread cutting field has equipped the Winter Brothers staff with a wide experience of tapping problems. Hundreds of case histories carefully recorded and filed for future reference, of threading problems successfully solved, give our engineers a unique background and particularly qualify them to solve your tapping problems.

The user of Winter Taps is entitled to

this service — just one of the PLUS services offered by Winter Brothers. For the quick solution of your threading problems contact your local distributor handling Winter Taps. He has within his reach the complete resources and research facilities of the Winter Brothers Company.

You get low cost production when you use Winter Taps. Specify them — always! Immediate delivery from distributor and factory stocks of catolog listed items.





ENGINEERING & MANUFACTURING

Corporation

JANESVILLE, WISCONSIN, U.S. A.



# TORIT ... DUST

COLLECTORS
remove the dust menace from
grinding and polishing machines.

Improve working conditions and protect valuable machinery with TORIT Dust Collectors. Attached to grinding, polishing and cut-off machines they clean the air and recirculate it back into the room.

Completely self-contained, and portable, TORIT Dust Collectors are located right at the machine. There is no extensive piping. They are easy to maintain and low in operating costs. For complete information and the latest TORIT catalog write:



303 Walnut St.

St. Paul 2, Minn.



In the flexible shaft line durability counts—and Haskins Flexible Shaft Machines are durable.

These portable tools will stand continuous hour after hour usethree shifts a day-seven days a week. They'll turn out more work -better work-faster and easier, with longer trouble-free operation. For grinding, sanding, rotary filing, wire brushing, buffing or polishing—use Haskins machines—use them hard. They won't let you down! Send for details.

9 H.P. Multi-speed countershaft unit. 975 to 3100 RPM. Three wheel heav duty truck. 360 motor swivel.





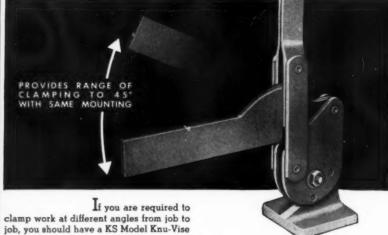


September, 1946

MACHINE TOOL BLUE BOOK

73

# This ONE CLAMP CLAMPING



toggle-action clamp-one of the most versatile clamps made.

By means of an ingenious tear-drop shaped sideplate this clamp permits change of toggle bar to any angle up to 45° without disturbing fixed base. Simply drill a hole in upright plate of base (through hole

already provided) at required angle of toggle bar to work-then set with dowel.

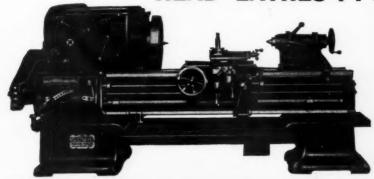
Made in 3 sizes to meet wide range of applications-accommodating pressure loads from 650 to 1200 pounds.



1334 PLUM STREET, DETROIT 16, MICH. 4328 SAN FERNANDO RD. GLENDALE, CALIF.

# Springfield :

HEAVY DUTY GEAR HEAD LATHES . . .



TOOL ROOM LATHES are equipped with Lead Screw Reversing Mechanism, producing right and left hand threads and feeds controlled by lever at right hand side of Apron, with automatic stops for both Lead Screw and Feed Rod. Oil Pan is also included as requiar equipment.

Extreme accuracy and long life are maintained in SPRINGFIELD LATHES by the deep, well ribbed hed mode from High Test Nickel Chrome Gray Iron. These beds are made in our own Poundry and, after exhaustive metallurgical and wear fests by professional laboratories, and practical tests in the field, this material has proven itself to be the best for use in lathe beds. It gives greater wear resistance, freedom from scoring, and freedom from internal strains, which factors all result in greater accuracy throughout the life of the lathe.

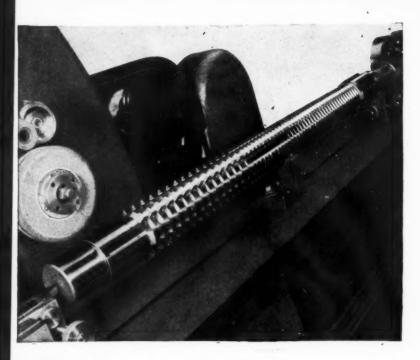
The direct reading Gear Box is tonqued, grooved and botted to front of bed and is the enclosed type to exclude dirt and chips from gears. Wide gears and heavy shafts are used with Ball and Bronze Bearings throughout. Thirty-six [36] changes of threads and feeds are obtained, and in connection with the Reverse Gears, either right or left hand threads can be produced without the use of weenther.

SEND TODAY FOR BULLETIN 116

### THE SPRINGFIELD MACHINE TOOL CO.

SPRINGFIELD

OHIO. U. S. A.



## In the Spotlight"...

SPLINE BROACHES UP TO 84 INCHES LONG. Complete Broach Tooling and Engineering Service . . . GAGES, Serration or Spline, male or female . . . Master Gears and Gear Racks . . . Master Index Plates . . . Splined Arbors for gear-grinding . . . Hobbing, Shaving and Checking . . . Production Broaching and Machining. Available from stock, Radius Gages for checking form and hook on broach tooth forms.

# GREAT LAKES Broach & Gage Company 1005 FRANKLIN STREET DETROIT 7. MICHIGAN

# S-A-Hol-Down Clamp Secures Work Pieces in Record Time!

Speed reconversion tooling. Set up your shop in absolute minimum time. With S-A-Hol-Down Clamp you lower production costs, get flexibility with greater speed.

Eliminate the old bolt and bar method. The S-A-Hol-Down Clamp can solve any problem around the drill press. Get 8,000 lbs. per square inch of equalized pressure with this compound leverage. Holds firm under fast drilling without turning or shifting. Practical for either precision or production work.

Order direct today. \$2450 f. o. b. Cordele, Ga.

Trade Mark Reg. Patent Pending

HARRIS FOUNDRY & MACHINE CO.

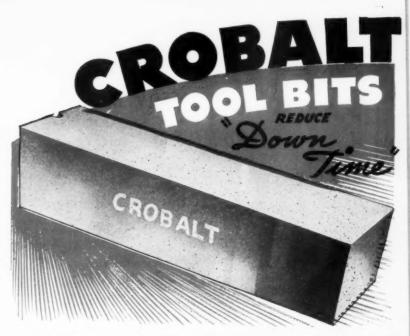


### With Two DI-ACRO BENDERS

A difficult production problem of forming two bends in a long length of tubing was solved by "teaming up" two DI-ACRO Benders as illustrated. This dual-forming arrangement saved installation of special machinery. Two accurately formed bends are obtained in one operation—without distortion of the tube and at a cost competitive to power operated equipment. More than 300 pieces are completed per hour—600 individual bends.

### "DIE-LESS DUPLICATING" Often Does it Quicker WITHOUT DIES

This is but one example of how DI-ACRO precision machines—Benders, Brakes and Shears—can accurately and economically duplicate a great variety of parts, pieces and shapes, without die expense. Write for catalog—"DIE-LESS DUPLICATING".



Crobalt is a cast alloy tool bit (containing principally chromium, cobalt, tungsten, vanadium, zirconium and carbon) especially developed for high speed production. At high temperatures (up to 2000 degrees) Crobalt cutting qualities remain constant.

The cutting edges of a Crobalt tool bit stay sharp longer, and thus assure you of much greater tool life between grinds. This automatically increases production by reducing "Down-time" ordinarily required for changing of tools. Try Crobalt in your shop.

Crobalt bulletin No. 45 contains valuable technical information and quotes prices on standard size tool bits—Send for your copy.

# GROBALT INC.

1360 North Main St.

Ann Arbor, Michigan

# An Amazing NEW INVENTION!

# THE SHEARCUTTER ROTARY BROACH PRODUCES PERFECT HOLES

For use with Lathes, Turret Lathes, Automatic Screw Machines, Drill Presses, Boring Machines, Etc.

### READ THESE ASTOUNDING FACTS!

- Uses a revolutionary new cutting technique and introduces a new machining method.
- 2. May be used to replace reamers and broaches.
- Eliminates costly second operations often necessary to produce finished holes.
- May be resharpened 10 to 30 times and lasts 5 to 10 times longer than conventional tools before resharpening is necessary.
- 5. Is equally efficient on ferrous, non-ferrous metals and other materials.
- Tends to sharpen itself automatically as the chips slide back over the cutting edge—chips resemble steel wool.
- Produces mirror-like finishes through Shearcutting action and true molecular cleavage.
- 8. Greatly increases production speeds and reduces costs.

YOU CANNOT AFFORD NOT TO USE SHEARCUTTER ROTARY BROACHES!



# Our 3 POINT POLICY

Insures Lower Production Costs for YOU

QUALITY Precision Built

1. Engineered for maximum production capacity

2. Built Right

3. Priced Right

Our customers like this 3 Point Policy. It keeps production costs down-halps keep them "in line."

\* Every tool we design and boild

must measure up to this yardstick. If you need tools to get work out F-A-S-T and without interruption, drop us a line TODAY!

### QUALITY TOOL & DIE CO.

Manufacturers of "Quality" Products

401-15 NORTH HOBLE STREET, INDIANAPOLIS 2, INDIANA







Hanson Friction Clutch Type "C" was designed to fill the need of a low price coupling to operate at moderate speeds. Each and every Hanson Clutch is constructed to do a specific job, and to do it with minimum of trouble and wear. Hanson Clutches consist of units to fit most any installation regardless of how severe the service, both as to load or speed of drive. There probably is a standard Hanson Clutch to fit your needs — if not, our engineers will help you with recommendations. Why not write us today?



More Speed...
LONGER DRILL LIFE
with CONTINENTAL'S

New DRILL CHIP
BREAKER

Faster drilling action and prolonged tool life are but two of many advantages obtained with the Continental Drill Chip Breaker. By breaking chips into small, uniform pieces that are easily carried up the flutes of the drill, clogging is eliminated. The unit can be used vertically, horizontally, or at any angle as long as the housing can be kept stationary while the drill rotates. The arm prevents rotation of the housing. Where space permits, the Continental Drill Chip Breaker can be used in multiple spindle heads. Write for Continental Bulletin 28161 for sizes, complete specifications and 7 ways to profit by this new Continental product.





With the Continental Drill Chip
Breaker, the chip
is broken at regular intervals. Small
loose chips are
easily carried up
the flutes. Holes
are straighter,
rounder, and have
better wall finish.

46-5

### CONTINENTAL TOOL WORKS

DIVISION OF EX-CELL-O CORPORATION
1200 OAKMAN BOULEVARD • DETROIT 6, MICHIGAN



# Since 1903

Strand Flexible Shaft Machines have answered the call for portable, rotary power with efficiently designed, solidly constructed flexible shaft machines that insure constant speeds with dependa-

bility and greater operator convenience. If your job calls for grinding, polishing, buffing, sanding, drilling, reaming, screw-driving or nut-setting—especially in out-of-the-way places, a Strand machine will do it faster, better, and stand up to it longer. Hundreds of attachments can be easily interchanged. 125 types and sizes. Models include vertical and horizontal type machines from ½ to 3 H.P. Distributors in all principal cities.

Send today for 112 page catalog showing complete line.





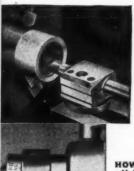
N. A. STRAND & CO.



Mhat's a gas-light gover to with tool holders?

Just this

considered good . . . old-fashioned tool holders were good, too . . . till operators used the



# HOWARD Method of SUPPORT

HOWARD TOOL HOLDERS

Height adjustment ring • Rigidity—accuracy—versatility • All sizes and models for bench lathes to roll lathes

HOWARD LIVE CENTERS

Back up ring for rigidity \* Thrust
spring for high loads \* Reground
or reconditioned for nominal
charge \* Pre-loaded and ground
for accuracy

HOWARD COMBINATION BAR TOOLS • Rigid height adjustment • Full length bar and blade clamp • Holders in 6 sizes



rite for the HOWA/LD Lethod of SUPFORT

HOWARD DEARBORN, Puc. 3370 West 140th Street, Cleveland 11, Ohio



When you want the best—whether it's a small tool, a doctor, an electrician or design, etc., you go to a specialist.

Curtis Universal Joint Company has pioneered in designing, improving and manufacturing industrial type universal joints EXCLUSIVELY for more than 20 years. We are specialists.

Whether it be universal joints for airplanes, machine tools, or special equipment and new applications, there is a Curtis Universal Joint that will meet or surpass every requirement for the job. If a Curtis Standard Joint, solid or bored, single or double, in sizes from 3/8" to 4" O.D. does not meet your needs, we will design and make a joint that will.

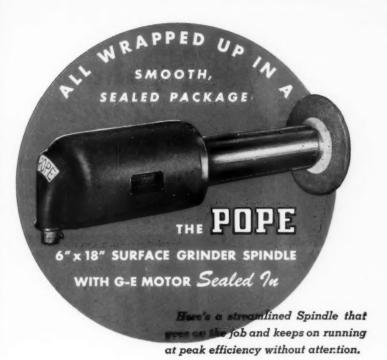
Why not use this highly specialized knowledge and service — our engineers will gladly go over your problems with you.

Specify
CURTIS
INIVERSAL JOINTS

Every joint made to CURTIS "STANDARDS" carries the Curtis Trademark — Look for it.

Write for technical data and useful Engineering Templates.

U CURTIS UNIVERSAL JOINT CO. INC



Note particularly the smooth, sleek housing of the sealed-in motor — the result of smooth teamwork by POPE and GENERAL ELECTRIC engineers. This motor runs cool and delivers full 1 HP at the wheel.

You can see for yourself that there is no fan, no air passages, no openings of any

kind. Dust and dirt are sealed out of both motor and bearings.

The lubrication is permanently sealed in — no time out for maintenance, no danger of running dry.

Pope Precision Spindles like this give you better final finishes.

Ask for Data Sheet No. 12.

No. 35

# POPE

POPE MACHINERY CORPORATION

SI RIVER STREET . HAVERHILL, MASSACH

BUILDERS OF PRECISION SPINDLES



THIS combination of matched units serves convenience and rigidity for accurately locating and chucking work when boring, milling, planing or for other toolroom and general use. They can be used singly or in variety of combinations for large or small work.

They are machined from box section castings, with Tee slots and flat surfaces in precise alignment.

They are made with the same tooling and quality as the JIGMIL table.

Each set includes Tee slat nuts, studs and screws.

Write for price and delivery!



**DevLIEG MACHINE COMPANY** 



LIEG 450 FAIR AVE. (Detroit) MICH.

# GOOD THINGS AHEAD

### It is reported that . . . . . .

President Buckley of Bell Telephone Laboratories describes a television tube no bigger than a pocket flashlight.

get ready with CONE for tomorrow

The new building of the American Stone Company in St. Louis will have an electrically controlled car suspended from the roof for washing windows.

getready with CONE for temorrow

A plastic molding press weighing 17 lbs. and costing about \$30 is offered by N. R. K. Manufacturing & Engineering Company of Chicago.

get ready with CONE for tomorrow

International Business Machines has a 6-key Braille typewriter and will give away the first thousand to blind veterans.

getready with CONE for tomorrow

Du Pont has announced a new, improved translucent "metallic" lacquer for automobiles called "Metalli-Chrome"

get ready with CHNE for tomerrow

Two former military pilots have established American Flyaway Service, at Dayton, Ohio, to deliver personal aircraft from manufacturers to dealers.

get ready with CONE for tamerraw

On its longest over-water run, Oakland to Honolulu, Naval Air Transport Service is landing its planes within 18 minutes of their schedule.

get ready with CUNE for tomorrow

In the upholstery plant of Fisher Body, the annoyance and danger of static electricity was eliminated by humidification. An incidental benefit was reduced absence due to colds. International Harvester is establishing a manufacturing research center with 350 men chosen from its plants all over the country.

got ready with CHNE for tomorrow

Westinghouse has a bacteriacidal ultra-violet lamp to insert in milk cans that reduces bacteria count 96% in one minute.

getready with CONE for tomorrow

The 6-mile canal dredged to supply the Dow magnesium plant at Velasco, Texas, with sea water is also serving as a freight artery.

get ready with CONE for tomorrow

Tucson Laundry Company has started twice-a-week laundry pickup service by air over a distance of 60 miles. "ENIAC", the electronic computor developed for the Ordnance Department, can do 100 manhours of mathematical work in two hours. It is expected to revolutionize the mathematics of engineering.

get ready with CONE for tomorrow

American Optical Company has developed a sight-testing instrument which will make 14 vision tests in three minutes.

get ready with CONE for towarenw

Beech Aircraft is developing a 6-passenger automobile with a 90-horsepower air-cooled engine that drives a generator powering separate electric motors on the wheels.

get ready with CONE for tomorrow

Martin Seneur Company has developed a method of paint mixing that will produce 1000 tints with accuracy from 6 basic colors. The idea is being tested at a "paint bar" in a metropolitan department store.



## STOP DUST WITH DUSTKOPS



Model 1150 DUSTKOP Dust Collector collects all the chips (note pile in back of DUSTKOP) from aluminum extrusion cut-off. Paddle wheel fan direct driven by continuous duty motor clears any size chip or shav-

ing; cyclone separator for a first stage cleaning is followed by spun glass filtering of air before recirculating to work space.

DUSTKOPS require no duct work: Install in minutes.

New style, low cost, spun glass filter, is fire-safe, easy to shake down and seldom needs renewing.

AGET-DETROIT CO. 605 First National Bldg. ANN ARBOR, MICHIGAN Phone 2-5585



Ask for complete information NOW on DUSTKOPS.

DUSTKOPS are LOW IN COST, EASY TO INSTALL, FULLY PORTABLE.

# HERE IT IS!



# SUPER'S NEW REAMER WITH FLUTE LONG CARBIDE TIPS

Supplied in sizes from 1/4" to 11/2" diameter. Delivery of practically all sizes from stock.,

You will find the Super FLUTE LONG CARBIDE TIPPED solid rearner gives you finer finishes, as scoring and galling due to worn flutes is eliminated. This is particularly true when rearning in Cast Iron and other abrasive materials. Grind time in the tool room will be cut down and the life of the tool in general is greater.

Try some now . . . Check performance and cost against that of older type Carbide reamers.

CARBIDE TIPPED FULL LENGTH FLUTES LASTING PRECISION

LESS TIME IN TOOL ROOM MORE GRINDS PER TOOL

FASTER PRODUCTION

MORE INSPECTION O. K.'s

Specify
SUPER
CARBIDETIPPED
TOOLS

\*

SUPER TOOL COMPANY

Carbide Tipped Tools

21650 Hoover Rd., Detroit 13, Mich. 4105 San Fernando Rd., Glendale 4, Cal.

# PRODUCT-PLANNING ... ? Find Out How PRODUCING ...?

### BRIGHTBOY

CUTS TIME and OPERATIONS IMPROVES PRECISION and QUALITY

### BURRING • FINISHING • POLISHING

The quality, finish and polish of CASTINGS, STAMPINGS, PARTS. . . . . . . .

The manufacture and maintenance of TOOLS, INSTRUMENTS, MACHINERY, MOTORS. . .

- all are improved by the simultaneous. operation-saving action of Brightboy's resilient rubber and abrasive.

FIND OUT about this innovation in finishing technique - definitely in step with the production of modern commodities in new or conventional metals and plastics. Ask your dealer for prices and catalog. Or ask us to have a Brightboy service representative call.

BRIGHTBOY STANDARD



BRIGHTBOY TUFF-TEX **BRIGHTBOY FINE-TEX** 

BRIGHTBOY INDUSTRIAL DIVISION WELDON ROBERTS RUBBER CO.

NEWARK 7, N. J.





## PRECISION ANGLES Are Set Up

FASTER . EASIER . MORE ACCURATELY

UNIVANCIF

Set-up time for single or compound angles on the Univ-Angle is reduced to a fraction of that required by any other method ... and Univ-Angle is more accurate, too. The Univ-Angle is set up with standard gage blocks — the positive method for greatest accuracy. No dials! No scales!



The work, clamped by magnetic attraction, is held firmly without danger of distortion, warpage or movement.

The Univ-Angle is made up of two hinged plates ground and lapped on all sides to precision limits. One of these units has a



Above: The two Univ-Angle units. They may be purchased separately or in any combination.

magnetic top plate; the other tapped holes. To set up compound angles, the magnetic unit is placed on top of the other unit. Angles can be switched from right to left hand by turning the top unit 180° on its base — without disturbing the work.

UNIV-ANGLE will save time and money in your shop, paying for itself in a short time.

Write for fully descriptive literature and prices today.



# GEROTOR

**HYDRAULIC PUMPS & VALVES** 

GIVE A hig lift to INDUSTRY IN

**CLARK Materials - Handling Trucks** 

At the heart of the power plant in the Clark industrial Trucloader...famed for heavy-duty lifting and tiering ...you'll find a Gerotor hydraulic pump and a Gerotor hydraulic valve at work.

These Gerotor units, and many others like them, are famed for the job **they** do... in a virtually limitless variety of industrial applications.

If you have a difficult hydraulic pump, valve or cylinder problem, Gerotor engineers can give **you** a "big lift" too!



GEROTOR MAY CORPORATION Baltimore 3, Maryland



### 5-PLUS FEATURES

- Greater accuracy and stability
- Longer wear life
- Less weight
- Positive identification
- Positive adjustment

ACCURACY YOU CAN TRUST

### WOODWORTH THREAD RING GAGE PROVES AMAZING SUPERIORITY OVER ORDINARY GAGES

Records for durability . . . for accuracy . . . for economy! They're being established regularly with the new Woodworth Adjustable Thread Ring Gage.

AUTHENTIC SHOP ACCOUNTS TELL OF MAINTAINING ACCURATE INSPECTION AS MUCH AS TWELVE AND ONE-HALF TIMES LONGER THAN ANY OTHER RING GAGE—AND ALL THIS ON EXTRA-TOUGH JOBS, CHECK THIS RECORD AGAINST YOUR EXPERIENCE . . . CONSIDER WHAT IT CAN MEAN IN CUTTING GAGE COSTS!

Then wire or write for our folder No. 46R.

### WOODWORTH

N. A. WOODWORTH CO., SALES DIVISION, 1300 E. NINE MILE ROAD - DETROIT 20, MICHIGAN PRECISION GAGES - PRECISION MACHINED PARTS - DIAPHRAGM CHUCKS - ADJUSTABLE CLAMPING JIGS - SPECIAL TOOLS



# In hand or on stand ONE electric drill does the job

When you buy a Stanley Electric Drill you get two highly efficient tools for the price of one . . . for the Stanley Drill operates with speed and accuracy in the stand as a bench drill or separately as a portable drill.

This extra utility, double-duty drill, gives you double your money's worth. Write for folder on complete line. Stanley Electric Tools, New Britain, Connecticut.



Tenda Mask

HARDWARE · HAND TOOLS · ELECTRIC TOOLS

# Look to SCHERR for latest developments in precision-production aids

## MAGNE-BLOX

## multiply usefulness of magnetic chucks

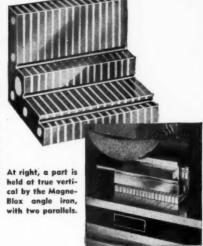
The Magne-Blox angle iron illustrated, placed on a magnetic chuck, will hold work vertical and at a vertical angle if desired.

Toolmakers' angle iron is only one of the handy additions to magnetic chuck value. Parallels, V-blocks, special forms and angles can also be supplied. With these tools, almost any work-holding contour can be provided. Write for the Magne-Blox folder, showing many ways In which these units save you time and meney.



Its diamond point will dress grinding wheels to any radius up to 1"—concave or convex. By setting with gage blocks, depth gage or micrometer, great precision is easy. Particularly valuable in grinding correct and uniform rake angles on collapsible tap chasers, taps, end cutting tools, etc. Full data in the bulletin, on request.





# "ALL-PURPOSE" GRINDING

To grind cutting tools at any of four standard angles—3, 5, 7 or 10 degrees, simply rotate the off-center tilting block to bear on the correct face. Takes all the guess work out of fool grinding—gives absolutely uniform results. Enables grinding carboloy tool bits both right and left. Write for the bulletin on this heandy tool.



GEO. SCHERR CO., Inc. 198 LAFAYETTE STREET

# "BASIC UNIT+PARTS" PLAN



(RIGHT) A SET-UP "TAILOR-MADE" FOR CUSTOMER'S NEEDS

A delivery bottle neck was broken by machining 3 brake band segments at a time with this special arrangement of Minneapolis Production Lathe. Special face-plate holds 3 segments. Counterbalanced loading fixture mounted on carriage is swung back for refill while lathe is operating.

### refill

the equipment needed for your particular production "set-up".
4 different drives.

Special set-up speeds up brake band production.

SMALLER INVESTMENT — Lower Production Costs

The "MINNEAPOLIS" Production Lathe is extremely adaptable to any production set-up, particularly second operation work. Its simplified design and ease of control enable inexperienced operators to turn out high speed volume production.

The "MINNEAPOLIS" has 24" collet capacity, 14" swing, heavy duty spindle assembly. It is backed by more than 50 years designing and manufacturing experience. Send for literature — write us your production problems. Send sample part or drawing if possible — let us quote you on a "tailor-made" lathe for your work.

### CENTRAL MACHINE WORKS CO.

Machinery Designers and Manufacturers Since 1890

1245 Central Ave. N. E.

Minneapolis 13, Minn.

MINNEAPOLIS

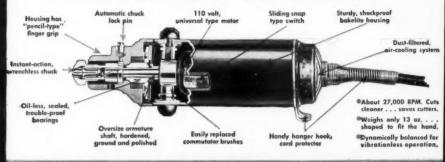


Dremel's improved, "pocket size machine shop"... the famous Moto-Tool... can save you hours, by speeding up work now being done by hand. It cuts, grinds, routs, carves, engraves, cleans and polishes. Invaluable as a sharpening tool alone... for taps, drills, gouges, chisels, tools and cutters (without tearing down "set-ups"). Moto-Tool is a "war veteran"... Thousands of them were used at far flung maintenance bases by every branch of the armed forces. For years such plants as General Electric. Westinghouse, Remington Arms, Ford, Nash-nipulating work in the same production of the armed forces. For years such plants as General Electric, Westinghouse, Remington Arms, Ford, Nash-new bought Moto-Tools for use in tool rooms and on production lines. It your Mill Supply Distributor doesn't carry Dremel Moto-Tool and accessories, write the factory or nearest Dremel representative for information.

The popular Moto-Tool Kit No. 2. Ideal for tool-rooms, service and maintenance depts. 23 accessories and a Model 2 Moto-Tool

The popular Moto-Tool Kit No. 2. Ideal for tool-rooms, service and maintenance depts. 23 accessories and a Model 2 Moto-Tool in a felt-lined, finely finished wood case . . . retails at \$23.50. Moto-Tool No. 2 only, with one emery point . . . ideal for production lines . . . \$16.50.

### LOOK FOR THESE MOTO-TOOL FEATURES



### DREMEL MANUFACTURING COMPANY WRITE THE FACTORY OR CONTACT

Mill Factor Produc 62 Murray St.

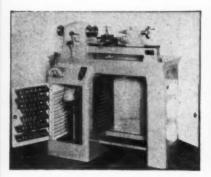
### DEPT. 216-K UR NEAREST DREA

F. W. Fewler 137 Federal Boston 10, Mass

### RACINE, WISCONSIN REPRESENTATIVE

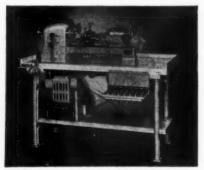
2221 Second Ava Seattle, Wash.

# ON SMALL DIAMETER ASSUTE ULTA



### Elgin Knee Hole Type Bench Lathe

Has Variable Speed Drive with range from 120 to 3800 RPM. 9" swing, 17" between centers, 1" cellet. Generous leg room for operator. Doer of motor cabinet fitted with cellet rack. Three roomy storage shelves,



### Elgin Open Bench Lathe

Laminated hard maple top, enclosed motor, safety guard for bett, handy collet drawer. Variable Speed Drive for any spindle speed from 120 to 3600 RPM. 3" awing, 17" between centers, 1" cellet.



### Elgin Knee Hole Type Hand Screw Machine

Variable Speed range, 120 to 3800 RPM. 9" swing, 1" collet capacity. Collet rack inside of motor compartment door. Independent coolant sys-tem (5 gal.) mounted in rear, outside—cleaner, more accessible.



### Elgin Vertical Bench Milling Machine

Preloaded ball bearing spindle. 9/16'' collet capacity. Five speeds ranging from 400 to 4000 RPM. Vertical travel of spindle, 134''. Table  $4\frac{1}{3}$ "x18",  $90^\circ$  swivel each side of center line.



# Efficiency

### RENCH TOO

The entire line of ELGIN High Speed Precision Bench Tools is designed to pay you dividends in better machining results, faster production, greater versatility, maximum operator convenience. The machines shown here assure "complete coverage" of your needs for both toolroom and production work. Note the trim, clean-cut lines . . . the provisions for operator comfort . . . the ample storage space for tools and accessories. And remember-the Elgin Bench Tools shown in the large illustrations (with exception of Vertical Miller) are equipped with the VARIABLE SPEED DRIVE which permits instant changes of spindle speeds over a wide range of RPM without stopping spindle and shifting belt. Operator is encouraged to use proper speed for each operation, changing as often as necessary . . . which means closer precision, better finishes. Write for specifications, prices, delivery dates!

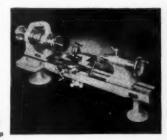


### Elgin Desk Type Bench Lathe

Variable Speed Drive, 40 to 4000 RPM. Low speed cate for grinding operations. Free turning spindle for truing-up and setting work by hand. Ample drawer space. 9" swing, 17" between conters, 1"



Two Lathes at Right (reading top to bottom)



### Elgin Herizontal Bench Milling Machine

Variable Speed Drive, 85 to 2750 RPM. Collet capacity, 1". Table 4\(\frac{4}{a}\)" x 18". Longitudinal travel, 12". Transverse travel, 6". Vertical travel,

1772 BERTEAU AVE. CHICAGO 13, ILL.

### (Upper) Model CB-5C **Precision Bench Lathe** Open Cone Headstock. I" collet capacity, 9" swing, 17" between centers, 38" 17" between centers, 36" bed. Speeds up to 4000 RPM. Flat belt only.

(Lower) Model 4EV **Precision Bench Lathe** Open Cone V-belt Head-stock. For either V or flat belt. 7/16" collet capacity, 7" swing, 17" between cen-ters, 32" bad. Speeds to 1000 RPM. MACHINE TOOL BLUE BOOK



September, 1946

# MOTOR TOOL WE CENTER

WILL Outlast A BASKETFUL OF Ordinary Centers

### Here's Why!

You no longer have to guess whether you are overloading MOTOR TOOL Live CENTERS. When the load is too great a RED BAND around the spindle disappears into the housing. You can see at a glance when overloading occurs.

This is an exclusive feature, developed by MOTOR TOOL, that cuts MOTOR TOOL Live CENTER repairs to practically nothing—immeasurably INCREASES their life—and puts an end to burnouts, breakdowns and work spoilage.

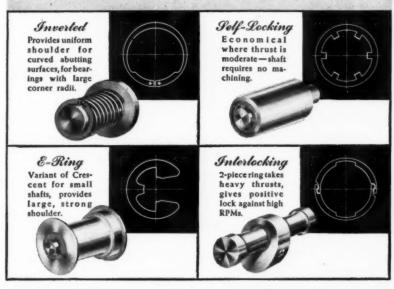
for NEW
Descriptive
Folder

MOTOR TOOL MANUFACTURING CO.

METAL CUTTING TOOLS

Make it a Rule to Call Motor Tool

# Precision fastening for any need: Waldes Truarc Special-Type Retaining Rings



 There's a Waldes Truarc precisionengineered ring to answer every need.
 Truarc Retaining Rings give a neverfailing grip because of their mathematically precise construction. No matter how demanding your specifications, it's a simple matter to refine your present designs to save material, machining and assembly costs. Waldes Truarc engineers will help you, will give your particular problem individual attention without obligation.



Waldes Kohinore, Inc., 47-10 Austal Place

Waldes Kohinore, Inc., 47-10 Austal Place

Long Island City 1, N. Y., Dept. 22 F

Flease cend Catalog No. 4 on Truste Retaining Rings to:

Name

Title

Company

Address

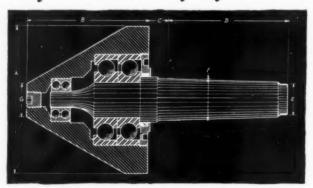
City

Tose

State

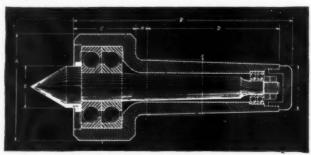
# ROOFE LIVE CENTERS

Buy the Best - why try the rest



### **Bull Nose or Pipe Centers**

Roofe Bull Nose Centers are used for any tubular machine work, tool joints, oil field or similar jobs. Bearing capacity 2,000 lbs, to 40,000 lbs. Nose sizes to your specifications.



# Roofe Type "M" Centers

Type "M" Centers are used to rough turn, finish turn and to thread without chattering. Used on grinders to a tolerance of .0001". Have been used for turning shafts of 28,000 lbs. and castings weighing 46,000 lbs.

From an engineering standpoint Roofe Centers are basically correct in principle and meet the hearty approval of machinists.

Standard or Special Tapers can be furnished to your specifications.

#### ROOFE MACHINE WORKS

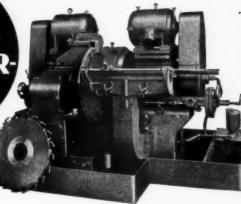
5415 Harrisburg Boulevard

W. 31604

HOUSTON 11, TEXAS

# 2 to 3 Seconds to GARDNER GRIND

## THESE FIBRE WASHERS



PRODUCTION-WISE users of plastic parts now employ GARDNER-GRINDING to speed up stock removal and finishing operations. Fibre washers, pump spacers, and breaker arms are some of the many plastic products that are being quickly and accurately ground on two sides at one time.

The No. 125-23" Gardner Double Grinder, shown here, is equipped with a trough feeder and plain rotary carrier, for grinding washers and spacers; and a clamping rotary carrier, which is fed by hand, for grinding breaker arms. Semi-automatic in operation, it insures high production (see figures at right).



PRODUCTION: 20 to 40 pieces per minute.

Usa Madori GARDNER WIRE-LOKE Abrasins on YOUR Disc Grissland

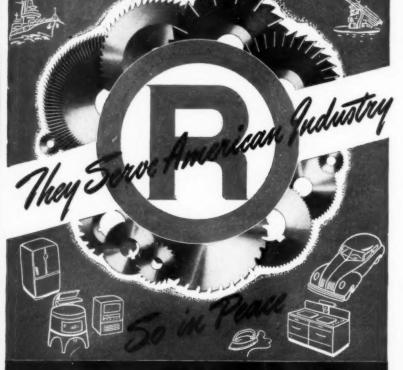
TOLERANCES: .0005" to .001" for parallelism. .001" to .002" for uniformity.

STOCK REMOVAL: .015" to .025" max. overall.

GARDNER-GRIND YOUR Flat SURFACES Write for Bulletin on GARDNER-GRINDING!

GARDNER MACHINE COMPANY
436 East Gardner Street . . . . Beloit, Wisconsin, U.S.A.

CIRCLE ® METAL CUTTING TOOLS



CIRCULAR TOOL CO., INC.

PROVIDENCE 5, R. I.

CHICAGO - PHILADELPHIA - NEW YORK - DAYTON - CLEVELAND - DETROIT 51. LOUIS - MINNEAPOLIS - LOS ANGELES - ROCHESTER + INDIANAPOLIS





TUMA GEARSHUFT DRIVES

of new or used machines requiring selective speeds.

Submit your drive problems to Lima Engineers...

there is no obligation for this service.



THE LIMA ELECTRIC MOTOR CO.

240 FINDLAY ROAD

LIMA, OHIO

LIMA GEARSHIFT DRIVES



# MACHINE OF THE MONTH

PREPARED BY THE SENECA FALLS MACHINE CO. "THE So-owing PEOPLE" SENECA FALLS, NEW YOR

# So-swing IMP LATHE

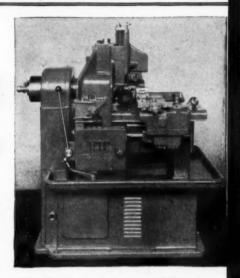
meets exacting demands on

# SHOCK ABSORBER PART JOB

Problem: To finish turn various diameters and shoulders, and face both ends of a shock absorber part... to maintain a close degree of accuracy in volume production... to provide machines easily changed-over for other work.

Solution: Two Lo-swing IMP Lathes were selected for this job primarily because they provided the necessary speed, productive capacity and close accuracy demanded. By equipping these IMPS with standard Overhead Third Arms it was possible to avoid using complicated form tools (objectionable when cemented carbide used as in this case), and greatly simplify the tooling setup. The demand for flexibility was admirably met with the IMP'S inbuilt, fully-mechanical Quick Change-over Mechanism. This feature was particularly important to the purchaser...a manufacturer doing extensive contract work, who did not want to charge the machine investment entirely against this particular job.

As mentioned above, Cemented Carbide Tools were used to maintain high productive efficiency on these lathes.



As shown in the illustrations, the Front Carriage carries three tools which turn three diameters on the OD; a single tool on the Third Arm finishes a step on the part to very accurate limits; the Back Attachment, equipped with two tools, faces both ends of the piece. The work is held by an air-operated Draw Bar.



LATHE NEWS from SENECA FALLS

# FASTENING HEADQUARTERS IS Chicago Rivet



When you want information on automatic rivet-setting or help with any production fastening problem, call on Chicago Rivet. Here, 26 years' fastening experience is at your disposal. Chicago engineers have lowered assembly costs and improved the products of hundreds of manufacturers.

# Free FASTENING CLINIC

Send us a drawing or unfastened sample or sub-assembly of your product. We will gladly analyze your fastening needs, recommend the type of rivet and Chicago Automatic Rivet-Setter to do the job best, and submit estimated production rates. No charge or obligation.

Model 121 Chicago Automatic Rivet-Setter

## CHICAGO RIVET & MACHINE CO.

9610 W. Jackson Blvd., Bellwood, Ill. (Chicago Suburb)

Automatic Rivet-Setters • Tubular and Split Rivets in all Rivet Metals



grinding with the accuracy and versatility obtainable with platen grinding. Simply attach the N-2 Handy Grinder to your present grinder, slip on a belt of any grit required to do the job and you have a modern, efficient abrasive belt grinder. The N-2 is quickly adjusted for vertical or horizontal use within a 90° arc.

With the resilient contact roll, the N-2 speeds cutting . . . keeps work piece cooler, since the belt has 4 times the cutting surface. Use contact grinding for burring, generating radii, removing flash, clean-up and general polishing. Platen is used for squaring, flat grinding and angles. The flexible belt can be used to grind and polish concave, convex and other irregular surfaces and hard-to-get-at V angles.

The N-2 is easily carried to any department or bench in your shop; it only weighs 14 lbs., 13 oz. without electric motor, which is not supplied.

Send for film "Machine of the Age", featuring Wet Belt Machining—loaned FREE.

PORTER-CABLE MACHINE CO. 300-9 Exchange St., Syracuse 8, New York

Write today for further

details of this amazing

SURFACING

PLATEN GRINDING



+ Clenger TAPER SHANK

**Utility Sleeves** 

= MAXIMUM /

Made for all standard tapers and all small tool sizes, either decimal, fractional, numbered or lettered, or Republic Shankless Drills. Positive collet action grip.

> Taper shank convenience, without its high cost.

> SHIPPED FROM STOCK

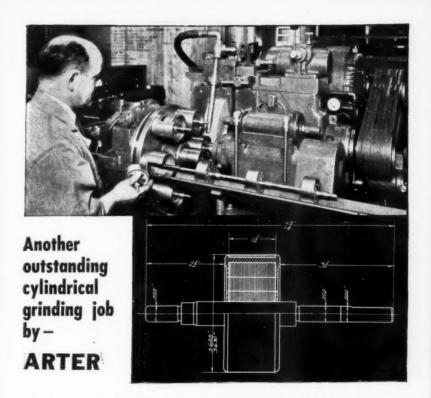
Write for Folder A Today

This
Husky
Driver
Outlasts
Dozens of Drills
or
Other Small Tools

THE J. C. G L E N Z E R CO., Inc.

6465 EPWORTH BLVD.

DETROIT 10, MICH.

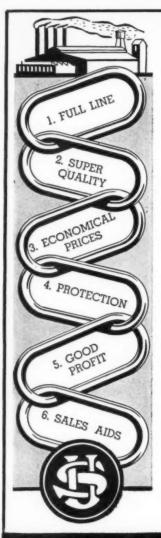


The grinding of the diameter of the laminations of an armature for  $\alpha$  washing machine motor is one of the many jobs on which this machine is giving typical ARTER satisfaction. Production—200 pieces per hour. The central taper shaft diameter is ground before assembly with  $\alpha$  production rate of 300 per hour.

No. 135 Arter Automatic Cylindrical Grinder

# ARTER GRINDING MACHINE CO.

WORCESTER, MASSACHUSETTS • U. S. A.



# A Six-Link Chain Connects You and Your Supplier with

# UNITED STATES ELECTRICAL TOOLS

Your supplier is α concern of consequence... an organization trained to help you select the proper tools for your work. You can depend on your supplier for intelligent advice, not only on electrical tools but thousands of other items.

# UNITED STATES ELECTRICAL TOOLS AND ACCESSORIES IN STOCK

by leading automotive, mill supply, hardware, electrical, plumbing, machinery and farm implement jobbers.



#### MOTOR-IN-BASE BUFFER AND POLISHER MODEL 110

For the polishing and burnishing trade. Practical and economical for their individual type work because it eliminates an outlay in cycle changing equipment and waste in power transmission.

Write for catalog and details.

The UNITED STATES ELECTRICAL TOOL Co.

# For Speedy Precison Production

# SPEED MOTOR SPINDLE

#### MANY EXCLUSIVE FEATURES

This new CANEDY-OTTO Radial Drill provides all the best features of many larger, more expensive radial drills, plus many exclusive features of its own.

It is powered by a 2-HP constant horse power, ball bearing mounted motor of 4-speed type, providing 8 spindle speeds; Three-button station provides instantaneous forward or reverse direction changes without going through the "stop" button for tapping; it has four rates of power feeds, changeable while machine is in operation; Large graduated dial and automatic trip provide for speed and accuracy in predetermined depth drilling.

Column and arm rotate on annular ball bearings and Timken bearings. Vertical movement of the arm on the column is controlled by a 2-way drum switch and motor. Saddle head rides on ball bearings, but clamps on hardened jib, to relieve bearings of load. The base is heavily ribbed, provided with T-slots and coolant tank. Unit is available in 3 ft., 4 ft., and 5 ft. arm models.

Write for detailed specifications.



CANEDY-OTTO engineers specialize in the design and production of drill presses. We build nothing else. But we do offer the world's most complete drill press line a faster, more productive, more economical drill press for every drilling need. See us first for your drill press requirements. And when you have a special drilling problem, let a CANEDY-OTTO engineer — a drill press specialist - help you solve it.





CANEDY - OTTO MFG. CO. - CHICAGO HEIGHTS. ILL.

# NOW!! YOU CAN REALLY REDUCE YOUR DRILLING COSTS With A

MORE PRACTICAL DRILL JIG-VISE

THE LIFT-SWING

YOU CAN LOAD AND UNLOAD FROM THE TOP

(Top can be swung one side as illustrated below.)

#### THINK WHAT THIS MEANS

Much faster operation — much easier operation and a much greater range and variety of jobs per size fixture. Extra top plates can be purchased easily and quickly installed.





After drilling, top can be quickly swung one side and without removing piece from fixture, you can body drill, chamfer, counter-bore or tap.

WHAT A SAVING OF TIME as well as a greater degree of accuracy and alignment of the finished hole.

Larger size jigs are made with a hinged top that can be swung backwards - very sturdy in construction and embodying the same time saving and precision features as in the smaller lift-swing type.

CHOICE TERRITORY OPEN FOR CHOICE REPRESENTATIVES.

WRITE FOR COMPLETE PARTICULARS

#### LIFT-SWING FIXTURE CORPORATION GARWOOD, N. J.

237 SOUTH AVENUE

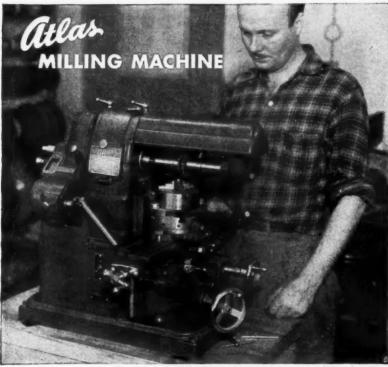


Photo Courtesy Miller Electro Research Laboratories, Milwaukee, Wis.

## **QUICKER, MORE EFFICIENT on Small Parts Operations**

YOU CAN save a lot of set-up time and effort in the tool room or on the production line — in the tool room or on the production line
— with this compact Atlas milling machine.

Any part that comes within its 4½"x18"
table, traveling 10" longitudinally and 3½"
cross-table, can be milled to close tolerances
quickly and easily. There are eight spindle
speeds from 62 to 2870 RPM. Three types of
table controls are available — manual, lever,
or Change-O-Matic. Adding air chuck and
control devices gives you a semi-automatic ma-

control devices gives you a semi-automatic ma-

chine capable of surprising production records. The Atlas milling machine, like the rest of the Atlas 4 Tool Team, helps you "match the machine to the job" to lower machine-hour costs and eliminate wasting the capacities of large machines. Send for latest catalog with complete specifications and

operating views.
ATLAS PRESS COMPANY, 950
N. Pitcher. St., Kalamazoo 13D, Michigan.







# Special Gages Quicker

The quickest way is to call the Detroit Tap representative in your area. He has readily available up-to-the-minute stock lists of Detroit thread plug and ring gages. You can obtain a copy immediately and a revised copy every two weeks by phoning him today.

BALTIMORE 21, MdESsex	2	2366
BIRMINGHAM, AlaBirmingham	7-	1017
BOSTON 16, MassLiberty	,	9398
BUFFALO 2, N. YGRant	è	6601
CHICAGO 12, IllKEDzie	è	3170
CINCINNATI 2, OMAir	i.	2544
CLEVELAND 13, OCHerry		
DAYTON 2, OFUltor	1	6161
DENVER, ColoKEystone		7229
DETROIT 11, MichMAdisor	1	0260
FLINT, MichFlint	4-	3661
HOUSTON 2, TexFAirfox	C	1426
INDIANAPOLIS 9, IndFRanklin	i	2456
LOS ANGELES 37, CalifADams	1-	4381
MILWAUKEE 2, WiscDAily	-	4256
HIDDCOD		~ · · ·

MUSKEGON, MichMUskegon 248
NASHVILLE 6, TennNashville 6-3647
NEWARK 2, N. JMArket 3-1493
PITTSBURGH 19, PaATlantic 3011
PORTLAND, OreVErmont 2334
ROCKFORD, IllMAin 2243
ST. LOUIS 1, MoCEntral 4435
SAN FRANCISCO, CalifDOuglas 7711
SEATTLE 9, WashMAin 6427
SOUTH BEND 3, IndSouth Bend 3-0009
SPOKANE 8, WashMAin 2191
SYRACUSE 9, N. YSYracuse 8-1462
TOLEDO 4, OGArfield 8302
MONTREAL, CanadaMAin 5346
TORONTO, CanadaWAverly 2688
777: 1 4 0000

WINDSOR, Canada.....Windsor 4-9229



# Spot · Butt · Arc WELDERS

Eisler resistance spot welders are available for all types of welding in ½ to 300 KVA sizes. Write for catalog. Ask about our contract spot welding service.



Ask for Eisler's latest catalog.

35KVA. Air operated. Slide Horn. Adjustable Arms. Weld Timer and Contractor. Excellent for universal applications.

75KVA. Multiple Press Type. Air operated. Weld Timer and Contractor.





Arc Welders
100 TO 400 AMPS.



Butt Welders



AIR MOTOR OPERATED

Spot Welders



PRESS

Spot Welders
FOOT, AIR
OR MOTOR OPERATED

Chartister 1

ENGINEERING COMPANY

762 SO. 13th STREET NEWARK 3, NEW JERSEY

# Minimum Investment - Maximum Production

# NEW-FIELD Universal

# **FLY CUTTERS**

- . . . REDUCE inventory and maintenance costs.
- . . . SAVE ON time, labor and expense.
- . . . BECAUSE one easily adjustable New-Field Fly Cutter performs a variety of production jobs.

The New-Field fly cutters provide an economical and efficient means of putting your idle standard tool bits to work. Designed for high speed or carbide tool bits, the New-Field Fly Cutters provide you with a wide range of special shaped milling cutters.







FOR FLAT SURFACE - STRADDLE MILLING - SLOT CUTTING ON ALL METALS AND PLASTICS

NO COSTLY PRODUCTION LAGS due to broken or dulled cutters . . . simply remove the defective bit and continue operation. The New-Field Meehanite cutter bodies, developed specifically for efficient FLY-WHEEL ACTION, absorb vibration, prevent tool chatter, reduce power requirements and increase cutter life. MORE CHIP REMOVAL per horsepower with New-Field Fly Cutters.

Regular models, 4" to 10" diameters — 54" to 1" widths. Extra heavy 6" and 8" diameters - 13%" width

Write for descriptive bulletin.

## THE RENDISTONER FIE NEW-FIELD MACHINED PARTS CO. General Offices: 549 W. Randolph St., Chicago 6, III. Factory: 210 West 7th St., Los Angeles 14, Calif. Export Division: 80 Broad St., New York 4, N.Y.



# CENTRIFUGAL COOLANT PUMPS



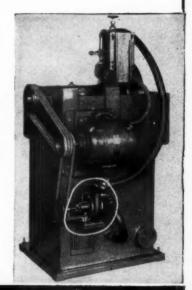
Keep work cool
. . . prolong
life of tool

THAT'S axiomatic ... and practical as well as economical. FULFLO COOLANT PUMPS have only one aim in life ... to help speed production ... prolong the usefulness of your machine tools ... save money, time and labor.

Coolants flow steadily, uniformly, dependably.

Standard or special models; pipe sizes %" to 1½"; motor, direct or belt drives; spring tension packing; chips or grit cannot interfere; automatic adjustment,

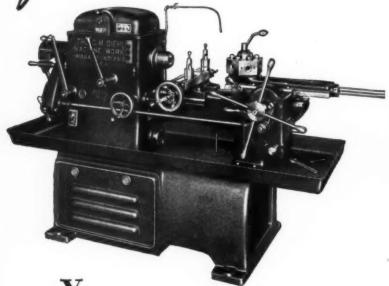
Write on your letterhead, please, for FULFLO ME-CHANICAL DATA BOOK.





Specialties Co., Inc.

# Use DIEHL TURRET LATHES for those Production Jobs



AOU can't beat Diehl for smooth accurate cutting to rigid specifications... just the lathe for those "production" jobs. In addition to its high speed precision performance, it works right alongside other No. 2 lathes of standard make —using same tooling, including collets. Write today for complete specification folder and details.

Swing-over Bed ......14"
6 speeds.....forward and reverse
6 feeds......to turret slide

The G. M. DIEHL MACHINE WORKS, INC

WABASH

INDIANA

11 . 5

# Jeatured In This Issue

COOLANTS have been selected primarily for maximum production of quality items at low unit cost. But where do the "ants" come in? In the sludge, rusting of the work, decomposition of the coolant, dermatitis, rancidity, and burning of the work. Most of these troubles are separate problems. D. C. Miner of E. F. Houghton Co., reviews the whole situation and tells what can be done about it in the story commencing on page...129.

PRECISION MEASUREMENT, Part III deals for the most part with optical flats. Mr. Baker reviews the theory and use of optical flats and gives many illuminating examples. Turn to page 141 for the start of this interesting feature—and save all the different installments for future reference.

MISCONCEPTIONS about Carbide Tools have delayed the general adoption of these valuable production aids. Harry Crump of Carboloy ennumerates the more common of these misconceptions and debunks them in the story commencing on page.....185.

BEADING is commonly used to trim, finish, and strengthen the raw edges of sheet metal guards, splash fenders, pans, and other sheet metal devices. H. F. Williams introduces and explains the prevailing practices in this regard in the story on page.....189.

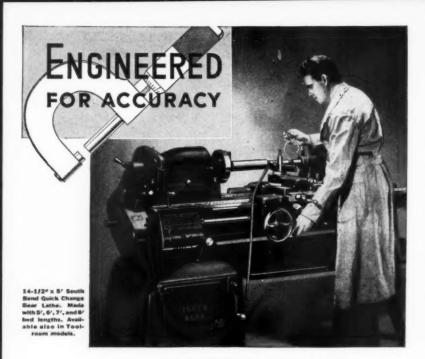
COOPERATION is the keynote of Mr. Robert's current offering. He stresses

PROTECTIVE PLASTICS—Here is a new one developed by G-E, which would seem to have great possibilities and widespread use. See page. . . . 225.

WIDENING the Useful Boring Range—describes a new development—the use of boring bars made of solid Carboloy cemented carbide. This is based on the premise that it should be possible to bore deeper and smaller holes as the greater stiffness of the carbide can be used to keep the tool from backing away from the work or from winding up in the hole. See page. 231. for this interesting discussion.

WHAT'S NEW in metal working is the regular parade of new tools, new equipment, and new methods, starting on page .......272.

MECHANICS THRU THE AGES page ......388.





#### HANDLEVER DRAW-IN COLLET ATTACHMENT

South Bend Attachments and Accessories simplify and speed tooling, often save delay and expense of making special fixtures. Write for illustrated Catalog No. 77 which shows the complete line of South Read Attachments and

South Bend Lathes are engineered to meet exacting needs for precision accuracy in all types of industries, and to maintain their accuracy year after year, even under strenuous production conditions. Accuracy and long life are built into South Bend Lathes as carefully and surely as they are built into fine timepieces. Correct design based on nearly forty years of research and experience, quality materials specially selected for specific needs, expert craftsmanship, strict inspection through all phases of production and assembly, and thorough testing to rigid working tolerances before shipment, guarantee dependable performance in the laboratory, toolroom, and production shop.

South Bend Engine Lathes and Toolroom Lathes are made with 9", 10", 13", 14½", and 16" swings, and bed lengths to 12'. Turret Lathes are made with collet capacities to 1". Write today for free 68-page catalog which illustrates all sizes and models, gives detailed specifications, and shows all attachments and accessories. Ask for Catalog 100-D.

LATHE BUILDERS SINCE 1906

SOUTH BEND LATHE WORKS
426 EAST MADISON STREET . . SOUTH BEND 22, INDIANA



# as The Editor Sees It

CONTRARY to some of the gloomy predictions in print, machine tool output registered a gain during June. July first, the backlog of unfilled orders exceeded that on June first, showing a continued upward trend.

Thus for six consecutive months, machine tool builders have been taking on more orders than they have been able to fill — a situation very different from the rather discouraging picture based upon immediate postwar outlook.

An encouraging feature also was the downward trend of cancellations.

Foreign business taken by American tool builders during June constituted about 32% of the total new business during that month.

Indications were that July would be another good month for new business. A slight easing was reported of the critical shortage of electric motors. However, many machines had been held up awaiting motors before they could be shipped.

"Bring prices down by producing the goods" — this headline appeared on the front page of Labor's Monthly Survey for July issued by the American Federation of Labor.

This was followed up with—"Produce—turn out all the goods you can. Whatever you produce will help flood the market with products you want to buy and help to bring down the prices you have to pay. Increased efficiency is the way to higher wages, lower prices for the consumers, better markets for your products and more secure jobs for you."

At long last, it looks as tho labor is beginning to realize its responsibility, for these sentiments were also expressed by some in the CIO ranks.

It is hoped that labor leaders now appreciate what a period of full production without strikes will do towards holding prices down and raising take-home pay of the workers.

# Which Abrasive is right for the Job?

When adequate consideration is given grinding cost figures accounted for in wheel life, man hours, power consumption, volume and quality—selecting the best abrasive assumes new importance.

Aluminum Oxide and Silicon Carbide are the two most widely used abrasives. In many respects, characteristics of each differ widely. The degree of variation is further extended in the many modifications of each type.

To choose one of these types of abrasives only on the basis of the material to be ground is not enough. Other variables affect the selection. Among these are contact area of wheel and work, amount of stock to be removed, and type and condition of the grinder.

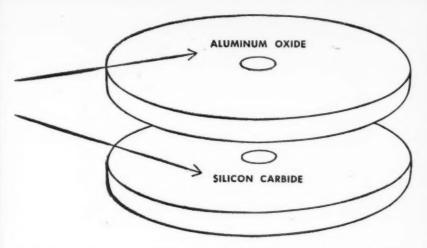
To render practical aid in correctly evaluating these and other factors, as well as to serve as a double check on your choice, The Carborundum Company has organ-

# A good rule for good grinding... CALL





MACHINE TOOL BLUE BOOK



ized a system which many successful concerns depend on for improved grinding, at lower cost.

A CARBORUNDUM salesman or our distributor's representative is your first contact with this system. These men personally can offer worthwhile suggestions based on a knowledge of current abrasive developments, plus plenty of on-thejob experience.

When the problem calls for an unusual

solution, one of our Abrasive Engineers is called in. A trained specialist, he is supported by the findings of the world's best known abrasive laboratories.

Because you are interested in better grinding at lower cost, it makes sense to take advantage of this practical, easyto-use service. Whenever you have an abrasive question, feel free to call in CARBORUNDUM. The Carborundum Company, Niagara Falls, New York.

# IN CARBO

#### BONDED ABRASIVES

#### WHEELS

Silicon Carbide Aluminum Oxide Diamond Cylinder Hones

Sticks, Stones & Rubs

Specialties

#### COATED ABRASIVES

Paper, Cloth and Combination

Sheets, Rolls, Discs

#### ABRASIVE GRAINS AND COMPOUNDS

Polishing Lapping

Pressure Blasting Finishing

"Carborundum" is a registered tra<mark>demark whicô indicates manufacture by The Carboru</mark>ndum Company



# Ryerson Laboratory Adds Extra Value to Steel from Stock

Steel from Ryerson means more than just steel from stock. It means that every heat has met exacting Ryerson specifications—based on more than 103 years of experience in the steel industry. It means that chemical analysis and physical properties are "as advertised" because Ryerson never stocks "seconds" or off heats. And often, it means steel made more valuable to you by the work of the Ryerson laboratory.

Whether you specify, buy or fabricate steel the laboratory serves you. There's no need for hit or miss heat treating when the laboratory runs Jominy hardenability tests on every heat of alloy in Ryerson stocks. Furnishes the results at no charge as a guide to heat treatment.

The laboratory also prevents uncertainty when definite specifications must be met. If carbon steel plates must not exceed a certain hardness limit, or if bars must have specified tensile strength, laboratory tests select the exact steel you need from Ryerson stocks.

These and other trouble-saving laboratory services point up two important reasons why more steel users call Ryerson: Persistent Ryerson effort to provide more complete, more practical service on steel from stock plus constant vigilance in maintaining high quality.

Because of the steel shortage many sizes still are missing from Ryerson stocks, but your size or a workable alternate may be available. Contact the nearest Ryerson plant when you need steel.

Joseph T. Ryerson & Son, Inc., Steel-Service Plants at: Chicago, Milwaukee, Detroit, St. Louis, Cincinnati, Cleveland, Pittsburgh, Philadelphia, Buffalo, New York, Boston.

PRINCIPAL PRODUCTS: Bars • Structurals • Plates • Sheets • Mechanical Tubing Safety Floor Plate • Alloys • Allegheny Stainless • Tool Steel • Boiler Tubes Beinforcing Bars • Babbliff Metal • Boils • Rivets • Metal Working Tools • Machinery, and Committee C

# RYERSON STEEL

# Removing the "ANTS" from Coolants

By D. C. MINER\*

OR many years, cutting oils have been purchased with one thought predominantly in mind—maximum production of quality items, at lowest possible unit cost.

This objective is primarily important, and rightfully so, but should not loom so large as to completely crowd out of the picture several other considerations which should be given cutting oil purchases. Lack of sufficient thought for other than production factors may result in troubles associated with, but not necessarily a part of the metal removing process.

For instance, a coolant may perform excellently for cutting, grinding, honing or whatever the operation may be, at least insofar as the removal of the desired amount of metal, and the leaving of a satisfactorily smooth surface is concerned. But troubles may have arisen from one or more of these causes:

1—Gum and sludge on the machine, in the oil lines, or in the reservoirs.

2-Rusting of work and machine.

3-Decomposition of the coolant.

\*E. F. Houghton & Co., Philadelphia, Pa.

In many machining operations, the right kind of coolant prolongs tool life and improves finish of the work.



4—Dermatitis.

5-Rancidity.

6-Burning of the work.

Each of these may constitute a separate problem, and altho most additives used in the blending of cutting oils will remedy some of these conditions, they may not improve others at all. As an alternative, some additives may superficially treat all of these conditions, without doing too creditable a job for any of them. Only the correct combination of additives suited for each of these troubles can be blended to form a cutting oil which will handle efficiently the machining job, and minimize troubles incidental to it.

Stability of the oil probably is the most vital factor in determining the extent of some of these troubles, certainly at least for the first three mentioned.

An unstable oil actually "breaks down" under use, leaving gum and sludge to accumulate on the machine, and to clog the oil lines. As a result of this separation, only an inefficient fluid, bearing but slight resemblance to the original coolant, is left for circulation over the work. In soluble oils, where there is a high percentage of water, and the circulating residue has a pronounced tendency to cause rust on both work and machine. Rust inhibitors which are efficient when the coolant is new, may be entirely inadequate after decomposition occurs.

Heat generated during machining operations, temperature variations such as exist between processing and cooling in outdoor reservoirs, or the cold often encountered in transit or in unheated storage buildings, may cause a breakdown in oils which are unstable. The resultant decomposition greatly detracts from all the useful properties of the coolant.

It is unfair to condemn a coolant as unstable, however, simply because it decomposes. Many oils have a high inherent stability which would resist the ill effects of temperature extremes far beyond the period when the user drains the reservoir and discards the coolant. In many cases, decomposition which has necessitated the draining is not due to instability in the oil as manufactured.



Coolants are important in grinding, preventing overheating and discoloration of the work,

Rather it is too often the result of contaminating substances which have been picked up by the coolant.

Such contaminants are usually in the form of lubricating oils, food scraps or some other types of refuse which have become mixed with the coolant. Bacterial action upon such items leads to a decomposition of the oil, apart from

# A TIME-HONORED VETERAN OF THE PRECISION WORKER'S CRAFT

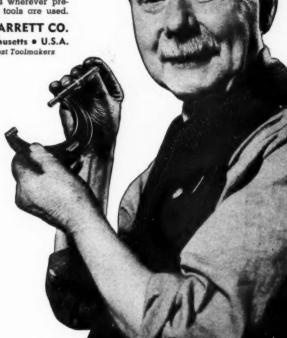
Forty-one years of continuous service with Allis-Chalmers Manufacturing Co. are convincing testimony to the value of Olaf Olson as a precision worker and master of his craft. Sixty-six years of service to the manufacturers and skilled workers of America have made Starrett Tools the outstanding choice of buyers and users wherever precision measuring tools are used.

Photo courtesy Allis-Chalmers Mig. Co.

THE L. S. STARRETT CO.

Athol . Massachusetts . U.S.A.

World's Greatest Toolmakers



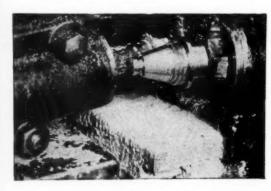
# STARRETT

METAL AND WOOD CUTTING SAND SAWS . GROUND PLAT STOCK

that engendered by temperature changes.

The effect of such contamination does not end with decomposition of the oil, however. The same bacterial action is likewise the cause of rancidity, with its nauseating effects on workers. containing metallic particles which abrade the skin; (b) germ-infested cutting oil contaminants; (c) personal allergy to oils in general.

Unfortunately, it is unavoidable that cutting oils, while not injurious themselves, serve as carriers for bacteria



The coolant flushes out foreign particles and assures better finish.

Altho the toxic effects of rancid oil are of relatively short duration, a permanent, more serious aftermath of using bacteria-laden oil, namely dermatitis, remains. There has been extensive proof, rather generally accepted, that cutting oils, per se, are not the cause of skin ailments.

Coolants, as they are shipped from the manufacturer, do not contain materials which would foster such troubles. Mild antiseptic additives, such as phenol, are usually employed to provide some degree of germicidal protection, but eventually the contaminants contain more bacteria than mild antiseptics can combat successfully.

Dermatitis may be attributed to a combination of any of these conditions: (a) improper personal hygiene, usually evidenced by attempting to clean hands or arms with dirty, oily waste, often which do cause trouble. Management, anxious to safeguard the health of employees, has sacrificed untold quantities of coolant, in the interest of sanitation, when such cutting oils, from a mechanical production standpoint, still had a long, useful life.

Burning of the work, the last of the six major troubles listed in the beginning of this article, might conceivably be called a mechanical problem, but since it does not affect the smoothness of the work surface, it is arbitrarily included in the non-mechanical troubles.

The seriousness of such burning, or blueing, of the work will vary depending (1) upon the alloy of steel being machined; (2) temperature actually reached at the juncture of the tool and work, and for what length of time; (3) depth of color; (4) composition of tool, and (5) whether any heat treating follows machining.

Here's a fast, economical method for cutting high quality Embossing Dies!

SORTON 3-Dimensional Pantograph Rough and Finish Cuts Die for Stamping Aluminum Bottle Caps at One Setting in One Hour

This large eastern manufacturer recently received an order for a die for embossing aluminum milk bottle caps. Nothing like it had been cut prior to the order so no set procedure had been established.

The job was tooled up on several machines in an effort to find out which would produce the most satisfactory results in the least amount of time. The outcome was definite and decisive. Of the machines used, the Gorton 31. Pantograph gave the best performance. Not only did it turn out the best die but burned it out in the record time of one hour.

#### Adaptable to Light Production Milling and Engraving Operations

Gorton Pantographs have no equal in the performance of intricate milling and engraving operations. They can be used for the profiling of grooves, consours and other shapes; for the cutting of dies and modds; for engraving numerals and designs in any machinable material; and for numerous other purposes. A special roll attachment makes it possible to work from a flat master or model around rolls, dies, dials, knurls up to 6" in diameter. Gorton Pantographs are available in two and three dimensional models to bhadle many sizes and types of work.

#### Consult Garton Engineering Service

Perhaps some of the work at which you are now engaged could be accomplished better, faster and with greater economy on a Gorton Pantograph. If you will submit detailed prints of your job to Gorton Engineering Service, our engineers will thoroughly investigate the possibilities and send you a complete report of the results. This service is offered free and without obligation.

#### JOB FACTS!

NAME OF PART—Milk Bottle Cap Embossing Die—Used in the manufacture of aluminum milk bottle caps.

MATERIAL—Tool steel—hardened and chrome plated after.

MACHINE — Gorson 3-Dimensional Pantograph, Model 3-L.

- Rough within .001"; depth .008"; speed 2300 r.p.m.
   Finish in one cut, depth .001"; speed
- 2. Finish in one cut, depth .001"; speed 2300 r.p.m.
  TIME—One hour.

FREE... Complete information on the Gorton Pantograph, write today for Bulletin No. 1655.

GEORGE SORYON MACHINE CO.

1409 PACINE STREET, RACINE, HISCONSIN, U.S.A.

Momentary high temperature such as caused by the "welding" of the chip to the tool would be insufficient to cause burning, if the heat were confined to that minute area immediately surrounding the tool tip. A broadening of this area, and lengthening of the time during which such temperature exists, would affect the work, if such temperature reached the range used in drawing that particular alloy.



Coolant keeps the abrasive wheel clean and free-cutting.

This is practically synonymous with the color reached by the steel, since such color is a fairly accurate indicator of the temperature reached.

Normally, the blueing affects only the work itself, since many tools are composed of alloys unchanged by relatively low temperatures associated with the blueing of steels. The same holds true for the bonding materials used in grinding wheels, which would likewise be unaffected by those temperatures.

Since much of the machining is done on carbon steels whose hardness would be affected by burning, great importance is attached to the cooling properties of the cutting oil. These properties are governed largely by the wetting out qualities of the coolant, which enable rapid conduction of heat away from the work and tool, thru its ability to spread rapidly over large areas of the work, and absorb the heat present in those sections.

If heat treatment follows machining, this worry may be eliminated, except for instances where the heat of machining may cause expansion of the steel, with the possible deviation from close tolerances which may be required.

Cutting oil manufacturers have been aware of these conditions. All have blended oils with various types of additives, in an effort to prevent, or at least minimize, such troubles. Their job has not been easy. In addition to maintaining good cutting qualities of the oil, the supplier is expected to include these in the coolant characteristics:

Stability to withstand temperature changes.

Detergent properties to keep gum and sludge away from machines and oil lines.

Germicidal action to minimize rancidity and dermatitis.

Excellent cooling qualities to prevent any tempering of work during machining.

One company, specializing in the blending and treatment of various types of oils, has recently made a general announcement of a product which, on the basis of early results in industry, may enlarge the user's concept of what germicidal properties should exist in a cutting oil.

From the management angle, this coolant has every quality necessary for

SCHOOL'S IN!

RECONVERSION is still going on—with many new men at many new jobs. How well do they know their tools? Considering the number of file kinds, cuts and sizes in existence, knowing The right file for the job is no small education in itself. Shop managements have found "file quizzes" helpful in testing mechanical "I.Q's." Here's another in the Nicholson series. Pass it around (make typed copies or tell us how many reprints of this ad you need).

NICHOLSON FILE CO., 16 Acorn St., Providence 1, R.I. (In Canado, Port Hope, Ont.)

#### **UESTIONS**

- 1. Why are Mill files so named?
- 2. How long (how measured) is an 8-inch file?
- 3. What are the four general types of file teeth?
- 4. In a double-cut file which is the "overcut" and which the "upcut"?
- 5. What are Swiss Pattern files and how, in general characteristics, do they differ from American Pattern files?
- 6. Special-cut files are generally used on what metals or alloys (name four)?
- 7. What is a Lead Float?
- 8. What type files come in flexible as well as rigid form; and how and on what are they generally used?
- 9. As distinguished by cross-section, name eight common shapes of files.
- 10. Name six "Do's" or "Don'ts" that will lengthen the life of any file.



- 11. What are the chief characteristics of a Lathe file?
- 12. How does a Brass file differ from an ordinary Flat file?

#### **NSWERS**

A check-up on the correctness of answers to the foregoing questions can be made by referring to the following pages of "File Filosophy." If you don't have this widely read authority on files and filing, write for as many copies as are reasonably needed by your shop heads. FREE.

1. Pg. 13	7. Pg.36
2. Pg. 11	8. Pg. 22
3. Pg. 12	9. Pgs. 14

**4.** Pg. 10 **5.** Pgs. 20 & 21 **16** & 17 **10.** Pgs. 30 & 38

6. Pgs.33 11. Pg.31 to 37 12. Pg.36





NICHOLSON FILES





Glendale, California

economical production, it is claimed. Low initial cost and easy miscibility, even in cold water, are features noticeable even before it is used on machining operations.

The coolant has a remarkable ability for cleaning residual gum and sludge deposited by oils previously used in machine tools, as proven by instances where a change of coolant has been made without flushing the reservoirs or oil lines. The oil has been found to have no deteriorating effect on the rubber oil lines thru which it is pumped to the machine.

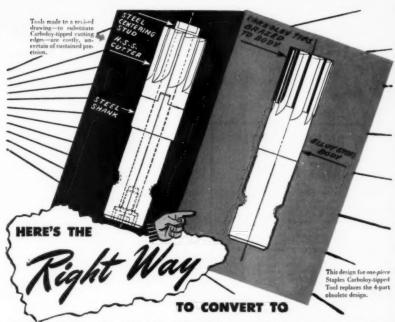
In one particularly noteworthy instance cited by the manufacturer, machines which had lain idle, with work still in place, over a period of two months following sudden cessation of work after V-J day, were found to be free from gum or sludge, not only on the. machines, but in the reservoirs Neither was there any evidence of separation of the oil.

That remarkable wetting out and cooling properties exist is evidenced by the absence of burning during grinding. The grinding wheels remain clean and free from loading. In machining operations of other types, tool life in boring mills, horizontal drills, reamers, lathes and similar machines is claimed to have been excellent.

Extremely high dilutions of 1 to 160 have been used for grinding, but even with this dilution there is no evidence of rust on tools or work.

From the workers' viewpoint, the results in their personal comfort are of greater importance. Instances are cited here as to how the use of this particular coolant has benefited them.

Rancidity in a normal type of cutting oil had required a change nearly every



# CEMENTED CARBIDE CIRCULAR CUTTING TOOLS

YOU GO FAR TOWARD OFFSETTING TODAY'S HIGHER WAGES through the increased production you get with STAPLES Carboloy cemented carbide tipped circular cutting tools. Their extra-hard edges cut deeper, cleaner to closer tolerances, faster. They require fewer resharpenings.

When you convert from high speed steel—as many another manufacturer is doing these days—convert all the way. High speed steel tools with Carboloy tips applied to the shanks are less efficient, and cost more than specially de-

signed or standard high precision Staples Tools.

Send us drawing of your high speed steel tool, and Staples engineers will submit drawing for complete new Staples Carboloy-tipped Tool, designed to take full advantage of cemented carbide superiorities.

Meet the challenge of increased wages with Staples Carboloy-tipped Tools. Mechanical science offers nothing finer.

#### THE STAPLES TOOL COMPANY

Formarly Stuples Tool & Engineering Company

CINCINNATI 28

QHIQ

# Staples CARBOLOY-TIPPED CIRCULAR CUTTING TOOLS

REAMERS • CORE DRILLS • SPOT FACERS • COUNTERBORES • END MILLS • SHELL END MILLS • ALSO A COMPLETE LINE OF CIRCULAR SPECIAL TOOLS



# HOW ROLLING CONTACT SAVES MONEY

Rolling Contact eliminates friction and enables the Lad on Roller Skates to clide with little effort over Cement Walks where Ice Skates which employ Sliding Contact, would be useless because of friction, The Roller Togles shown in the cut below employ Rolling Contact, enabling MULE-PUL CLUTCHES to develop with little effort



on the part of the operator, the POWERFUL, PERSISTENT PULL for which they are noted. These one-arm Toggles require no lubrication, have long life and seldom need replacement, even under constant in-and-out engagement. Another money-saving feature of value to you is the RING-OILING SYSTEM used on the Loose Pulleys of these clutches. This is proportional to the speed: needs filling but once in 30 to 90 days and protects you against ground-out Pulleys, scored Shafting and expensive shut downs. Over 25,000 MULE-PULL CLUTCHES are in daily use.



week, in one plant. After a change to the new type of coolant, several months would elapse before such a change became necessary. Meanwhile, the only additions of oil necessary were to maintain the level desired in the reservoirs.

The seriousness of the rancidity problem can be illustrated by conditions in one plant where, on Monday mornings, it was necessary to flow a coolant over a machine for one or two hours without any work being produced. This procedure simply enabled the rancid odors of the cutting oil which had been exposed to the air during the weekend shutdown an opportunity to became absorbed by the less rancid coolant flowing over it from the reservoir. Replacement by the powerful antiseptically treated oil made this practice unnecessary, since the rancidity had been checked. Not only were the workers pleased by the elimination of unpleasant odors, but management was saved many hours of production time.

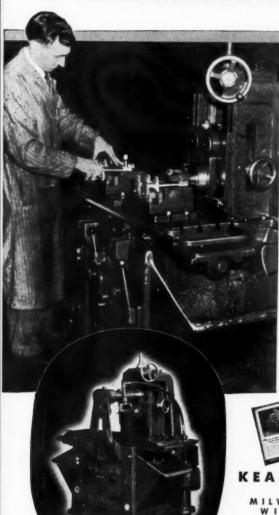
The germicide which terminated this oderiferous condition serves likewise to end practically all troubles from coolant-caused dermatitis, by preventing the bacterial growth which is its cause.

The desire to eliminate, thru use of specially treated oils, such conditions as might affect the welfare of employees became more pronounced among metal working plants during war production years.

While the primary objectives of longer tool life and finer finish are as important as they ever were, wetting-out, detergent rust preventive and antiseptic qualities of a coolant are receiving an increasing amount of attention. Machine shop superintendents have been quick to realize that their primary objectives are often more easily attained thru the use of oils which are high in the latter four characteristics.

Perhaps the day is not far off when it can be unequivocally stated that all of these factors are equal when selection of a cutting oil is made.

## CAN MINIMUM IDLE TIME



#### with CONTINUOUS Automatic Two-way Cutting Cycle on the **KEARNEY & TRECKER M-24** Simplex Milling Machine

THE Kearney & Trecker M-24 Sim-plex milling machine permits continuous operation with minimum idle cutter time.

Cast steel rods shown are being milled to length. Operation is speeded up by use of twin work holding fixtures, each accommodating two workpieces. A carbide steel milling cutter is applied on a continuous, automatic two-way cutting cycle. Automatic hydraulic controls for the table movement make the M-24 Simplex ideally suited to this job.

Kearney & Trecker M Series machines perform a wide variety of milling operations on small or medium-sized parts. Being equipped with a completely automatic and manual control system, they are readily adaptable to long or short run jobs.

#### CHECK THESE FEATURES

Three bearing spindle, with double overarms, arbor supports and outer arm brace assure maximum rigidity and accuracy.

Climb cutting equipment is standard—includes an adjustable nut and a fixed nut on a ground table feed screw to eliminate backlash in both directions.

Pick off speed and feed gears available for two speed ranges and three feed ranges to meet individual requirements.

Simplified directional controls assure ease of operation.

Built-in coolant and chip disposal system.



Write for complete data on M-24 Machines - BULLETIN No. B10A. Please indicate your business connection.

#### KEARNEY & TRECKER CORPORATION

MILWAUKEE 14, WISCONSIN

The compact construction of M Series machines reduces the necessary floor space to a minimum. Convenient table height facilitates setup and loading operations. The machines are available with either 18", 24" or 30" of power feed to table.



## SIZE CONTROL leads in Precision and New Developments!

Size Control engineers pioneered both plug and thread type "Go and No-Go" reversible gages. Both ends can be cut off as they become worn and/or turned end for endsix gages in one. Micro-finish chrome plated for greatly increased service life. Also in



Kennametal Carbide, Stellite and Sapphire. Trade-in allowance on worn gages. Complete line of ring and snap gages and gear and thread wires. Send for catalog.

#### New! TWIN-END PLUG GAGES

Pioneered by Size Control are plug gages with twin-plugs at one end for very close checking of out-of-roundness and exploratory purposes.





#### SIZE CONTROL CENTERLESS LAPPING MACHINES

A quiet, compact, economical unit for lapping oversize gages, salvaging worn gages by lapping to next lower size, and for lapping oversize bearings, bushings, shafts or contoured cylindrical pieces, the rolls for latter pieces being dressed to shape. Shipped complete with lapping compound, lapping sticks and A.C. 1/2 h.p. motor. Send for literature. See our exhibit at the Instrument Show!

## CONTROL COMPA

2500 W. Washington Blvd., Chicago 12, 111,

AMERICAN MACHINE & GAGE COMPANY

WALSH PRESS AND DIE CO. SIZE CONTROL CO Funch Presses. Precision

WACKER SALES DIVISION Precision Inspection

Engineering Representatives in Principal Cities





By WARREN BAKER

## Section 1 — Inspection Instruments, continued Part 3 — Optical Flats

OPTICAL flats give the instrument and tool inspector one of his most precise and versatile means of measurement. Once the using and interpreting of optical flats is mastered, it is one of the simplest methods. Measurements are read directly, little interpolation is required, and little special equipment is needed. A set of flats and a monochromatic (one color) light source (Fig. 1) fulfills most of the requirements.

Since most applications of optical flats require the use of some reference standard, however, a set of inspection or laboratory grade gage blocks also should be at hand. Since optical flat applications tend, in most cases, to emphasize any aberrations that may be present in the gage blocks themselves, these latter must have measuring surfaces as nearly flat and parallel as possible, in addition to being of known dimensional accuracy. How gage blocks may be inspected and calibrated with optical flats will be explained in detail in Section II.

Perhaps the best way to think of the pattern of interference bands that is visible when an optical flat is placed upon a surface under inspection is as contour lines on a map, as shown in Fig. 2. Contour lines connect all points of equal elevation and so do the interference bands, or "fringea," as seen under an optical flat. Why this is so will be considered shortly.

#### Flats, Not Lenses

Optical flats may be made of glass, pyrex, or fused quartz. Usually the latter is preferable because it takes an excellent surface finish, which is an absolute essential. Also, it does not introduce any aberrations in the fringes as the result of refraction errors, as glass may do; and it has an exceedingly low coefficient of thermal expansion.

Optical flats are not lenses. A lens has magnifying power; an optical flat does not. Its principal value lies in the accuracy with which its working surfaces are finished. This is usually to one millionth of an inch of flatness in master grade optical flats but may range up to as much as four millionths in working grade equipment. The flats may have single or double surfaces. If they have one working surface only, an arrow is usually ground into the edge of the flat pointing to the face that is the

working surface. Such arrows are shown in Fig. 1.

The flat should be thick enough so that it will not bend under working measurement pressures. Fused quartz will not warp to a measurable degree under the heat of the hands in use, its elasticity being about 1/16th that of glass and about 1/6th that of pyrex, according to tests made by H. L. Van Keuren.

#### **Energy in Waves**

We shall not, in this series, go deeply into the various theories and phenomena of light. Actually, no one knows exactly what light is. We assume it is a form of energy, and experience over



Fig. 1—A typical set of optical flats and monochromatic light for use with them.



some 400 years seems to prove that light and its related forms of energy, such as X-rays, gamma rays, cosmic rays and common electricity travel in wave forms. It is not on the waves themselves so much as it is their phases that interferometry, comprising the various systems of measuring by light,

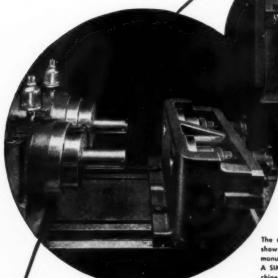
depends. To explain this, we shall take a very simple, if rather rough analogy:

When one drops a stone into water, some of the energy is transformed into visible waves of water, which travel outward from the point where the stone entered. The harder the stone strikes

#### ELEMENTS OF COST REDUCTION

SIMPLEX

Low Labor Cost
Low Tool Cost
Low Machine Cost
More Production
More Accuracy



The close-up and machine pictures show the equipment one progressive manufacturer selected to reduce COSTS. A SIMPLEX #2B Precision Boring Machine with two spindles and a rigid quick-clamping fixture provide all the elements of cost reduction listed above.

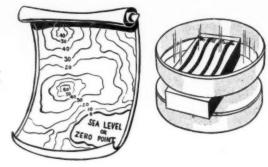
Precision Boring Machines

#### STOKERUNIT CORPORATION

SIMPLEX Machine Tools Division

4530 West Mitchell Street, Milwaukee 14, Wisconsin
Precision Boring Machines, Planer Type Milling Machines and Special Machine Tools

Fig. 2—The pattern of interference bands is much like a contour map.



the water, the higher will be the motion, or amplitude, of waves.

Let us suppose that it were possible to drop two stones of exactly the same weight from exactly the same height, a known distance apart. Two wave trains

RAY REFLECTED
FROM FLAT

DARK
FRINGE

BOTTOM SURFACE
OF OPTICAL FLAT

Fig. 3-Graphic explanation of the "mathematics" of interference.

of equal amplitudes are set up. When these waves meet, the crest of one wave reinforces the crest of the other, as do the troughs, doubling the amplitude of the wave. The waves then are said to be in phase. But should the two stones have been dropped so that the crest of one wave coincides with the trough of the other, they are exactly out of phase and cancel each other.

Thus with light. When waves of light of equal amplitude strike the eye in phase, the experience of brightness is multiplied. If waves even of the same amplitude, but somewhat out of phase, strike the eye, the brightness is dulled. If the waves are exactly out of phase, cancellation (darkness) results. This is known as interference.

When light strikes any polished transparent surface, half of it is reflected back at an angle equal to the one at which it arrived and the other half passes on thru. If the surface it strikes is not transparent, all of it, save what may be absorbed, is reflected back. And there you have the basic principle of light wave measurements, without all the physical and mathematical formulae and arguments that have resulted in the writing of many books on the subject.

# FLEXIBLE SHAFTS GIVE YOU

"Placeability"

#### IN EQUIPMENT DESIGN

"Placeability" is a word we coined to represent an important advantage you get when you use S.S.White flexible shafts in conjunction with any mechanical element requiring power drive or remote control.

The shaft serves to give you full freedom in locating both the element and its drive or control. It enables you to place them where they best satisfy space conditions and assembly, operating, and servicing requirements. The net result in many cases is a better product and simplified, lower-cost production.

#### WRITE FOR FLEXIBLE SHAFT BULLETIN 4501

This bulletin gives basic information and engineering data about S.S.White flexible shafts and their application.



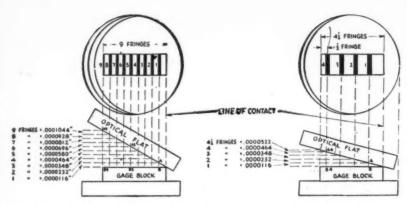
S.S.WHITE

THE S. S. WHITE DENTAL MEG. CO. INDUSTRIAL DIVI



FLEXIBLE SHAFTS - FLEXIBLE SHAFT TOOLS - AMERIAT ACCESSORIES SMALL CUTTING AND GRINDING TOOLS - SPECIAL FORMULA RUBBERS

One of America's AAAA Industrial Enterprises



Figures 4A and 4B-Showing that the smaller the angle, the fewer the fringes.

#### Formation of Fringes

Because, as you have seen, the angle of reflection (return) is the same as the angle of incidence (arrival), it is necessary to view the object to be measured under an optical flat from as nearly directly above it as possible. This causes the angle between flat and work to be kept quite small, as you will see. Thus fewer fringes will appear and they will

350

Fig. 5-Photo of a flat surface under optical flat.

be farther apart, and therefore more easily counted and measured.

How the fringes (the dark bands), are caused is shown graphically in Fig. 3.



Fig. 6-Irregular pattern shows surface is not flat.

When a light ray enters the optical flat it is divided, upon striking the lower surface at A, into two. One part is reflected back to the eye of the viewer and the other part goes on thru the flat and is reflected back by the object under inspection at B. Since both these



# S&E MACHINE PRODUCTS

BRIDGEPORT, MICHIGAN

GENERAL SALES OFFICES

306 PATERSON BLDG.

FLINT 3, MICH.

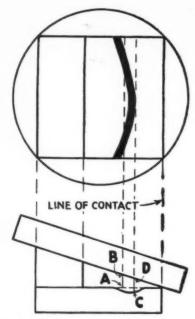


Fig. 7-How low spot curves the band.

reflected rays have the same length and amplitude, they can either reinforce each other to cause added brightness or, if they are exactly out of phase, cancel each other to result in darkness.

It will be obvious, of course, that no single ray can ever strike the optical flat and go thru this process of being split and reflected, but that there will be countless thousands or millions of rays striking the flat at the same time. But if they are from the same monochromatic light source they will all have approximately the same form, length and amplitude. A second ray—others have been omitted for convenience—is seen striking the bottom of the optical flat at C. It also would divide, of course, and be reflected back at some point farther to the left, but to avoid confu-

sion, this likewise has been omitted from the figure.

#### **Distance Determines Fringes**

What is important is that the half of the ray reflected back at B and the half reflected back at C, because, at the points indicated, they are fully in phase or exactly out of it depending upon the distance between flat and work, will result either in bright or dark bands as viewed from the surface of the optical flat. It is obvious also that they will be exactly out of phase when the distance from C to B is exactly one half a wave length greater or less than the distance from A to B. Then everywhere along the AC line at which the wave arrives a half length ahead or behind, or out of phase, a dark band will be seen by the viewer.

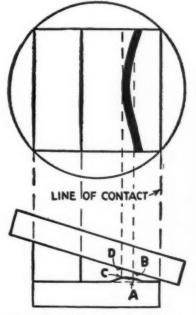


Fig. 8-How a high spot curves the band,

the practical

TO YOUR MILLING PROBLEMS

BRIDGEPONT MILLING MACHINE

The Bridgeport Turret Milling Machine with High Speed Attachment handles milling, drilling and boring at all angles, with maximum ease and convenience. It is accurate and speedy, sturdy and odd.

powerful—a precision machine for production demands.

Shaping operations can be performed at all angles, making this attachment tast
and practical on die and mold work of all kinds, as well as for intricate slotting

on production jobs.

Features include: 15" diameter turret with 5" overarm, rugged construction, table, knies and saddle in convenient front-of-machine position, anti-friction bearings throughout, keyed overarm with worm wheel control for angular settings, large diameter graduated dials.

Bridgeport

WRITE FOR BULLETIN

MACHINES INC. BRIDGEPORT, CONN.

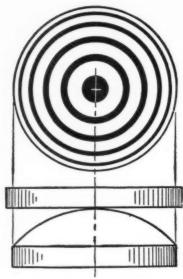


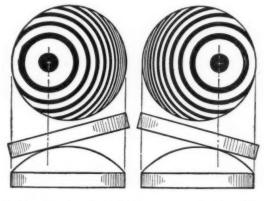
Fig. 9-A spherically curved surface.

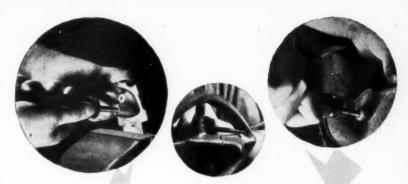
To get at the same conclusion by a slightly different route, let us suppose that the bottom surface of the optical flat is distant from the work piece by exactly the length of the light wave. The ray coming back to the eye from the surface of the work will then have traveled one full wave length farther than the one reflected behind: but since it is exactly one wave length it is still in phase and the two waves will reinforce each other to be seen as a bright band. But if the distance between the bottom of the flat and the surface of the work is half a wave length, the two returning rays are exactly out of phase and cancel each other, resulting in a dark band.

The length of the wave of helium vapor light, which is the sort of lamp commonly used to provide the monochromatic light for measurements with optical flats, is 23.2 micro-inches (0.0000232"), A dark band, then, results at every point along the line AC where the difference between surfaces is half that wave length, or 11.6 micro-inches (0.0000116"), or any uneven multiple of 11.6 micro-inches.

It will be seen from the foregoing that, to make the fringes appear at all, the flat must rest on the work at an angle to it. (Actually, "Newton's rings" can be seen thru a high magnification glass such as a telescope or microscope with the surfaces exactly parallel, but

Fig. 10—If pressure at one side moves the rings or bull's eye to that side, the surface is convex.





# The case of the versatile Rotaries



With the Nicholson ROTAKIT—a handsome case fitted with ten popular shapes of Nicholson Rotary Files—the industrial craftsman can perform innumerable filing operations. The ROTAKIT assortment has been carefully selected to handle the widest variety of jobs—from cleaning irregular surfaces to shaping fillets.

Nicholson Rotary Files can be operated by flexible shaft, drill press, lathe, portable power tool. Their versatility is matched by their high quality. Nicholson ROTAKITS are available in three assortments:

ROTAKIT No. 20 contains 10 assorted Nicholson Ground Rotary Files (burs).

ROTAKIT No. 30 contains 10 assorted Nicholson Hand Cut Rotary Files.

ROTAKIT No. 40 contains 5 assorted Nicholson Hand Cut and 5 assorted Nicholson Ground Rotary Files (as illustrated).

For ROTAKIT, or any individual assortments, contact your industrial-supply house, or write for any special information you desire.

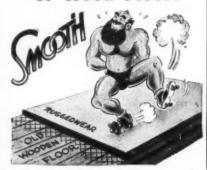
NICHOLSON FILE CO., 94 ACORN STREET, PROVIDENCE 1, RHODE ISLAND (In Canada, Part Hope, Ont.)

## **NICHOLSON ROTARY FILES**

HAND CUT AND GROUND-FOR EVERY PURPOSE



# Tough Resurfacer for Broken Concrete or Wood Floors



### Makes Durable Patch or Complete Overlay

Resurface or patch broken concrete floors with tough RUGGEDWEAR resurfacer. Here's a meterial which will stand up under the most punishing traffic conditions. Simple to install—no chopping or chipping required. Merely sweep out the spot to be repaired—mix the material—trowel it on. Holds solid and tight right up to irregular edge of old concrete. Provides a firmer, tougher, smoother, more rugged wearing surface, Used indoors or out.



#### FLEXROCK Co.,

3634 Filbert St., Philadelphia 4, Pa. Canadian Office: 21 King St., E., Toronto,

Ont.
Please send me complete RUGGEDWEAR
information . . . details of FREE TRIAL
OFFER—no obligation.
Name

\*

Company Address this is a phenomenon important only to physics researchers.) The smaller the angle, the fewer the fringes, as can be seen from a study of Figs. 4A and 4B. The fewer the fringes, within reason, the more easily may they be interpreted, as pointed out before.

The point or line of contact is highly important. It must be known or found to make accurate use of the flats as measuring instruments. If the contact is a line, as it usually is, the fringes will appear parallel to it, on a flat surface. In Fig. 4A, the line A9B9 is nine times as long as AB, so nine fringes show in the pattern. In Fig. 4B, however, the line A<sub>1</sub>B<sub>4</sub> is only four times as long as AB, and 4 fringes show, because the angle is more acute. It will be evident, then, that the fringes in this instance indicate only that there is a greater angle between flat and work in Fig. 4-A than in Fig. 4-B. How this will apply to certain problems of measurement will be shown in detail in later studies.

From the foregoing you will see that what was actually being measured in Figs. 4A and 4B was the acuteness of the angle at which the flat rested on the work. What is important about this matter now is that it establishes

Rule 1: If the surface under inspection is flat, the fringes will appear as equidistant lines parallel to the line of contact.

#### FLAT SURFACES

Methods to prove parallelism as well as flatness, or to detect the lack of it, will be developed later. A photograph of a flat surface under the optical flat is shown in Fig. 5. If the lines are not parallel to the line of contact or are not equidistant, or if they appear in an irregular pattern, the surface is not flat (Fig. 6). Why this is so will be seen from studies of Fig. 7 and Fig. 8.

## The Right BUR for the Job

# THE DOUBLE-TAPERED KELLER BUR

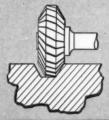
## Shape "T"

This is a double-tapered bur with a narrow straight section. It is recommended for removing high spots and surplus stock from grooves or for breaking corners of edges on narrow grooves—note the illustrations below. Shape "T", in common with other KELLER Burs, does a variety of work. Its versatility lends value to its effectiveness as an economical bur to have in the shop. Write for circular on other shapes and sizes of P&W KELLER Burs.





Breaking the corners of edges on a narrow groove.



Removing high spots and surplus stock in a narrow groove.

PRATT & WHITNEY
Division NILES-BEMENT-POND COMPANY
KELLERFLEX SALES DEPARTMENT

WEST HARTFORD 1, CONN.



In Fig. 7, there is a low spot on the surface under inspection. Remembering that a dark band is caused at every point where the distance between flat and work is 11.6 micro-inches or any uneven multiple of that distance, study Fig. 7 closely. It is obvious that a wave dividing at the point B on the working surface of the optical flat would not cause a cancellation at that point because there is no surface at A, 11.6 micro-inches below, from which it may be reflected. The fringe then will appear wherever the line DC equals AB or is a multiple of AB. To all intents and purposes, then the fringe "moves back" to DC and appears in the pattern as a curved line. By the same reasoning the curved line shown in Fig. 8 is explained. Here there is a high spot, so the fringe caused by what would be a normal cancellation at AB "moves up" to DC, where the distance is 11.6 microinches, or a multiple. Thus also are you now given

Rule 2: If the fringe band curves, there is a high or low spot on the surface.

Rule 3: If the fringe curves towards the line of contact (Fig. 7) a low spot is indicated. If it curves away from the line of contact (Fig. 8) a high spot is indicated.

#### The "Wedge of Air"

Up to this point I have purposely omitted from this discussion any talk of the "wedge of air" which usually proves so confusing to newcomers to the art of measurement with optical flats. The "wedge of air," which many users of optical flats refer to in explanations of their methods, actually is the angle between flat and work. There always will be an angle between these two surfaces, else the user will not be able to see the fringes. There may not, however, always be a point or line of contact.



Ettco-Emrick TAPPING ATTACHMENTS tachments, but you also get these three big "plus" features:

1. SENSITIVITY patented Ettco-Emrick friction clutch has the sensitivity of a hair trigger. This gives your work

full protection from spoilage and also prevents tap

2. EASY OPERATION—All the necessary tapping skill is built into Ettco-Emrick Attachments by special design features. That's why ordinary unskilled operators—men or women—can turn out fast accurate tapping with

3. ECONOMY—Ettco-Emrick Tapping Attachments not only save labor and materials, but they give you these savings at a very low first cost—because they work right on your presses like any other shank tool.

It's these "plus" factors that have made Ettco-Emrick Tapping Attachments favorites for so many years in shops throughout the country. They're a profitable investment for any shop.

For full details. WRITE FOR BULLETIN No. 2

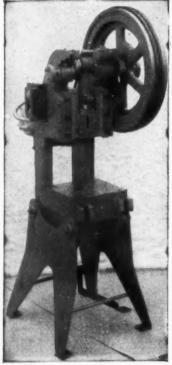
596 Johnson Ave., Brooklyn 6, N. Y. Detroit 1 Chicago 6

Over 25 years specialization in solving Industries drilling and tapping problems

SIZES FOR

No. 0 TO 1" TAPS

# ALL STEEL 20 TON CAPACITY



3" STROKE 10" SHUT HEIGHT 12"x12" DIE SPACE

PROMPT DELIVERIES

HIGHLAND ENGINEERING CO. 1732 BERKELEY ST. SANTA MONICA, CALIF. Actually the flat may "float" on a "wedge of air" and not touch the work at all. It will nevertheless be lower at some point than another and this low point or line will be regarded the "point or line of contact", even the there may be no actual contact.

While it may be impossible in some cases of actual practise to establish a line of contact, and interpretations of the fringe patterns may have to be made with the flat floating on the "wedge of air", it is always better to have an actual contact and have it definitely under the operator's control if at all possible.

#### **CURVED SURFACES**

Thus far we have been considering only surfaces that are flat, or relatively so. Now let us take up some of the patterns into which fringes fall when they appear on spherically or cylindrically curved surfaces.

In Fig. 9, is shown the appearance of a spherically curved surface under the optical flat. There will be a bull's eye or a heavy ring in the center with other rings growing narrower as they approach the edge of the work. What is important to note here is that the same sort of pattern is produced whether the surface under study is convex or concave. When such a pattern appears, then, the first thing the operator will want to establish is the character of the surface. The first thing to do is to move the flat from side to side. Then,

Rule 4: If pressure at one side moves the rings or bull's eye to that side, the surface is convex. (This is shown graphically in Fig. 10.

If pressure at the sides appears to have no effect, or little effect on the character and number of the rings, pressure should be applied in the middle. Then,



take auger bits through hard or soft wood and drill plastics with a template. In fact, every feature of MallDrills clicks with men who use them. Their cool operation under load...light weight and pistol grip that reduces fatigue...compact design that simplifies drilling in close quarters and cramped positions...and the quick, easy servicing of commutator and replacing of brushes without dismantling the drill.

Ruggedly constructed of the finest material for hand continuous use, with die cast aluminum alloy housings, 3-jaw, geared chucks, helical cut, hardened steel alloy gears, and universal motors. 5 powerful models with  $\frac{1}{4}$ ", 5/16",  $\frac{3}{8}$ " and  $\frac{1}{2}$ " capacities. Each available in 2 voltages—110-volt AC-DC or 220-volt AC-DC.

Ask your Supplier or write for literature and prices.

#### MALL TOOL COMPANY

7742 South Chicago Avenue

Chicago 19, Illinois

-★ 25 Years of "Better Tools For Better Work" -

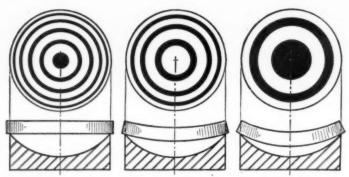


Fig. 11-If pressure over middle of the surface under study causes rings to widen or the bull's eye to grow in size the surface is concave.

Rule 5: If pressure on the optical flat over the middle of the surface under study causes the rings to widen or the bull's eye to grow in size, the surface is concave. (This is shown graphically in Fig. 11.)

#### Cylindrical Surfaces

If you have followed closely the discussion of light wave patterns thus far, you will already have an idea what pattern to expect when the flat is placed on a cylindrically curved surface. If



## MASTERDRIVES for PLANERS

Eliminates Lineshafting

Now you can have added flexibility in plant layout, because Masterdrive eliminates lineshafting and permits placing planers wherever you wish. The drive is supported by four supports. Each of these requires the drilling and tapping of four holes. Once supports and horizontal bars are in place, motor base and outboard bearing support can be moved laterally to line up with pulleys. Your present ceiling lineshaft pulleys are used on the motor counter shaft.

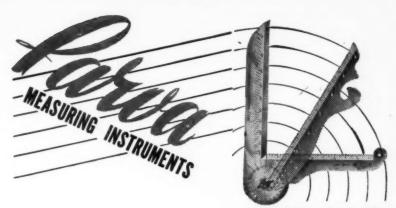
A single complete installation with Masterdrive—one responsibility. Over 1200 Drive Specifications—name your machine—we'll motorize it.



### THE MASTER ELECTRIC CO.

INDUSTRIAL EQUIPMENT DIV., DAYTON, OHIO

Machine Drives \* Electric Hoists \* Electric Hammers \* Engine Driven Generator Plants
Partable Grinders \* Big 3 (Power, Tool Operation, Concrete Vibration) Units \* Tampers



#### PARVA-GRAPH

COMBINATION SQUARE

MAIL MONEY ORDER

PARVA \$2.00

PARVA \$1.25

PLUS 10e POSTAGE

B. A. Taylor Co. (Plastic Div.) 11706 Woodward Ave., Detroit, Mich. THOSE WHO DRAW PLANS . . . THOSE WHO MAKE THINGS . . .

will find the Parva-graph an indispensable tool. Compact, versatile, it can be kept on desk or hung over work bench - handy for instant use when needed - always ready to serve as a French Curve. Dividers. Protractor. Triangle, Ruler. Compass, Mitre. Letter Weigher, Magnifying Glass, Spirit Level, etc.

COMBINATION RULER-



AND LETTER WEIGHER

B. A. TAYLOR COMPANY - AGENTS -

#### INDUSTRIAL DIAMONDS DIAMOND TOOLS DIAMOND WHEELS DIAMOND POWDER



Our No. 703 - three layers of seven diamonds each. Multiplicity of cutting points; depending on diameter of wheel, four or more diamonds will always contact the wheel, giving finer dressing and precision finish. Recommended in all straightfaced dressing and truing on wide-faced, hard silicon carbide wheels. Used most effectively on Cincinnati Centerless, Nor-ton Cylindrical, Landis Cylindrical, and Cincinnati Cylindrical Grinders.

Requires fewer passes across the wheel. Generally used with fast dressing tra-

"Experts agree they are the best on the market."



31 W. 47th St., New York 19 N. Y

Representatives:

Buffale-Irequeis Carbide & Abrasive Co.,

Buffalo—Iroquois Carbide & Abrasive Co.,
91 Grimsby Road
Pittsburgh—Commonwealth Sales Co.,
Cleveland—C. C. Halloran, 14315 Savannah Avenue
Chicago—J. R. Mendelssohn, 4744 Woodlawn Ave.
Les Angeles—273 S. LaPeer Drive, Beverly Hills
Tolede—Hull Industrial Supply Co.,
1644 Nerwood Ave.
Houston—Aeme Engineers. 730 M & M Building

the line of contact is along the longitudinal axis, the pattern will be straight lines, parallel to the line of contact, as with a flat surface, except that this time the lines will not be equidistant. nor will they be of the same width.

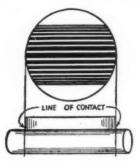


Fig. 12-Here's a graphic representation of a cylinder pattern.

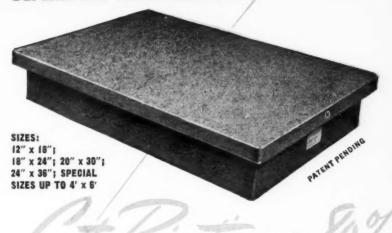
The widest band of fringes will be that directly underneath the flat, that is, in the middle of the pattern. Thinner bands will be seen at each side, growing ever thinner as the pattern approaches the edges of the "cylinder". The pattern is shown graphically in Fig. 12.



Fig. 13-Series of parabolas which is the pattern when contact is at one end of cylinder.

Now let us suppose that the line of contact between flat and cylinder is

#### DEPENDABLE MEASUREMENTS



## HERMAN Precision Granite SURFACE PLATES Economical — Non-Magnetic — Accurate to 50/1,000,000ths inch

Faster, more accurate work with increased production and a big saving on gauge blocks and precision instruments—these are only a few of the more important advantages reported by users of Herman Precision Granite Surface Plates. Cut from solid blocks of a specially selected natural bedrock granite, Herman Precision Granite Surface Plates are warp-proof, permanently flat and accu-

Nationally known users of

Precision Granite SURFACE PLATES

rate to 50/1,000,000ths inch. Being nonmagnetic, they cannot become charged with filings and emery dust; unaffected by ordinary temperatures, rust or corrosion, they outwear ten ordinary cast iron surface plates — yet they cost no more. Herman Precision Granite Surface plates pay for themselves many times over in tool economy, reduction of rejections and elimination of re-scraping charges.

Ask about our plan for a shop test in your own plant at our expense.

General Motors Chrysler Motors

General Electric Westinghouse Electric Crosley Radio Bendix Eastman Kodak Maytag Company U. S. Bureau of Standards

The Herman Stone Co.

324 Harries Bldg., Dayton 2, Ohio



A flick of the thumb and you've got your external and internal dimensions. Knife-edged Jaws provide exact thread measurements. A depth gage blade gives speedy depth measurements. Made of stainless steel or toolsteel; packed in a sturdy leather case. Scientifically engineered, painstakingly machined and American made, the AMIC Quick Action Caliper is a quality tool without a rival.

rage, repair shop, aircraft - maintenance, etc.

> Graduations in English—1/32" or I/40"; in Metric—full mm. Reading on Vernier 1/128" or 1/1000" and 1/10 mm.

Also AMIC Precision Vernier Calipers, Height Gages, Depth Gages, Pocket Calipers, Comparators, Precision Graduated Metal Scales.

Write for FREE Booklet C and price list or telephone PEnnsylvania 6-0687. \*Registered Trade Mark

AMERICAN MEASURING INSTRUMENTS CORP. 240 WEST 40th STREET NEW YORK 18, N. Y. not along the longitudinal axis, but is at one end of the cylinder. Actually it will not be, in that case, a line at all, but a point. The plane of the flat will be at a tangent to the surface of the cylinder. The contact and the resulting pattern are shown in Fig. 13. It will be noted that the pattern is a series of parabolas.

#### **Combination Patterns**

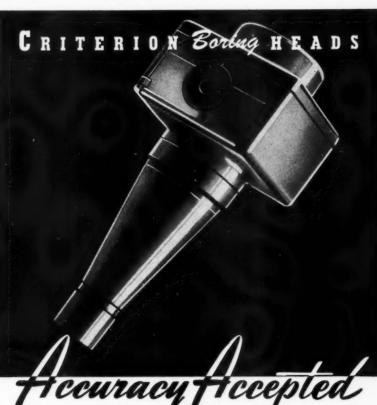
Should there be a high spot on the cylindrical surface, however, we get a combination of more or less spherical together with cylindrically curved surfaces and the pattern will be somewhat on the order of that shown in Fig. 14, a combination of round or elliptical, together with parabolic fringes.



Fig. 14—Here's the pattern when there's a high spot on a cylindrically curved surface.

There you have the essentials of light wave patterns. Straight lines, equidistant and parallel to the line of contact, show a flat surface and indicate parallelism, but do not necessarily prove it. Straight lines, parallel but not equidistant, show that the work is cylindrically curved. Straight lines that are not parallel to the line of contact or lines that curve away from or toward the line of contact show an irregular surface—out of parallel in the case of the straight lines and high or low in the case of the

162



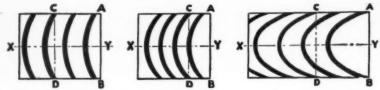
Extremely high accuracy is a standard feature of Criterion Boring Heads. Moreover, original accuracy is maintained far beyond normal expectation. Lead Screw is ground from solid AFTER hardening.

Extremely high accuracy is a standard feature of Criterion Heads are in use through-Boring Heads. Moreover, orig-

> Order from your dealer. Request free literature.



BEVERLY HILLS, CALIFORNIA



Figures 15A, 15B and 15C respectively, (left to right) showing a convex surface. 15B and 15C are fully described in the text.

curved ones—while rings and bull's eyes show a spherically curved surface, and ellipses and parabolas a cylindrically curved one.

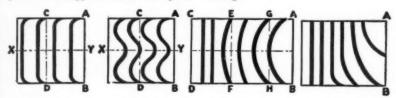
#### HOW TO MEASURE

The general method of measuring surfaces or aberrations in them will be given here, altho application of the method to specific inspection problems will be reserved for Section II.

First of all, however, the user of optical flats should remember this: while there has been repeated reference to the pattern that appears under the optical

flat as being composed of lines, and most workers in this field think of the pattern as one of lines, actually the fringes are bands, not lines at all. If the user of optical flats will so place the flat on the work that the pattern appears actually as bands of well defined width, not as narrow lines, his work so far as measurement is concerned will be made much easier.

Because the pattern is composed of bands, therefore, measurements are made from the middle of one band to the middle of the next, not from edge to edge.



Figures 15D, 15E, 15F and 15G respectively (left to right). The text fully describes the surface finish of the four specimens and interprets the readings obtained with the optical flats.



THE LIVE CENTER



with a
GUARANTEE

HEAVY DUTY

The unique design and construction of a Marveco Live Center gives it unlimited capacity over a long period of time coupled with automatic takeup to compensate for wear.

GUARANTEED to OUTPER-FORM and OUTLAST any other LIVE CENTER.

SEND TODAY FOR FREE CATALOGUE "THE MARVELS OF MARVECO."



MARVEL

TOOL & MACHINE COMPANY

3415 E. McHICHOLS ROAD, DETROIT 12, MICHIGAN



for metal — is quite comm

Andersons, Inc.

Write us or phone Buckingham 3417

2329 NELSON ST., CHICAGO 18, ILL.

The character of the surface under study will be more readily discernible if the bands are kept small, but measurement is facilitated if they are wider.

#### Some Common Patterns

In Fig. 15A, for instance, note first that the line of contact between flat and work is at AB. The fringes curve away from it, so the surface is convex. We know then that we have a high spot in what should be a flat surface. Line CD is one which you will draw in your mind's eye joining the centers of a fringe for comparison and to establish distance and amount of aberration. In this figure, then, the line CD is seen to fall about half way between centers of the bands on each side of it. The flatness error, then, is one-half a fringe or 5.8 micro-inches. The surface, is high along its XY, or longitudinal, axis by 0.0000058".

In Fig. 15B, the same character of surface is shown, but this time there is a full fringe of flatness error, or 11.6 micro-inches. Since the fringes again curve away from the contact line, the surface is 11.6 millionths of an inch high along the XY axis. In Fig 15C, the error is a full fringe and half of the next, so the error is 17.4 micro-inches of height along the XY axis. In this latter figure the character of the pattern suggests that the error in surface is a cylindrically curved one, rather than a mere "high-spot," not only because of the parabolic curves of the fringes, but also because of their extent.

In Fig. 15D is shown a condition that is quite common on small surfaces that are supposed to be accurately flat, particularly gage blocks or small toolmaker's flats. This surface is quite obviously flat along its top, but low at the edges. How much it is low at the sides is shown by the distance between the line CD and the centers of the fringes

INDEX
VERTICAL MILLS

FOR THE TOOL ROOM OR PRODUCTION LINE

For use with end mills 1/6" to 1" in steel. Equipped with verniers, as standard equipment in addition to micrometer dials on table actuating screws for locating. Further accuracy available with rods and indicators which can be furnished as extra equipment.

If you want speed and precision on milling, drilling and boring send for a catalog on Index Mills.



#### 12" TOOL ROOM ROTARY TABLE



A quality tool fer precision work in the tool room or production line, incorporating such features as hall bearings—hardened and ground worm—quick acting throw-out for free hand turning—single movement table lock that does not cramp table out of alignment—compound trough. 12" size only.

#### INDEX MILLS

Index Mills participated in all important war production programs from camera and guns to atomic bombs. Ask any owner how they like their Index Mill.

Write to Factory Sales and Distributing Agents for complete information.

# BLANK & BUXTON MACHINERY CO.

3100 E. MICHIGAN AVE. JACKSON, MICHIGAN

## THREAD-ALL Tapper



## PRECISION TAPPING !! LICKED !!

By Converting Any Drill Press into a Precision Tapping Machine.

Check these advantages:

Handles small taps without fear of breakage. Takes sizes up to  $1\frac{1}{2}$ " with ease.

Gives precision tapping without need of lead screws.

Electro-magnetically controlled positive depth setting.

No adjustments required for tap

Silent forward and automatic high speed reverse action.

Taps right or left hand without adjustment.

Machine may be used for drilling, reaming, counterboring, etc. without adjustment.

Write for full details.

GRUEN GAUGE CO.
10039 Marcus Ave. Detroit, Mich.

along each side, about half a fringe. So the sides are low 5.8 micro-inches.

Fig. 15E depicts a condition a little more unusual. Careful study reveals that this surface has middle and edges about on a level, but with a high ridge on both sides about halfway between center and edge. Drawing of the line CD shows that the error is about 5/16th of a fringe, therefore the two ridges are about 9.7 millionths of an inch high. Such a pattern as this should always be inspected next with the contact along the other axis. All sorts of interesting possibilities are suggested when such patterns appear.

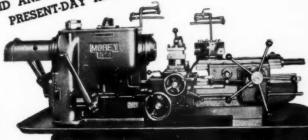
In Fig. 15F, the line of contact is still at AB, but CD, the imaginary line previously drawn to connect centers of fringes, is now replaced by two new reference lines EF and GH, because the surface is increasingly aberrent from left to right. At the left end it apparently is flat, but grows increasingly high as we approach the right end. The error about halfway is shown by the reference line EF and is about half a fringe, but at GH has grown to a full fringe. It is therefore high by 5.8 microinches at EF, and by 11.6 micro-inches at GH.

Fig. 15G, shows a surface flat on the left end, but grow-increasingly low toward the upper right corner, where the error has finally reached two full fringes, or 23.2 millionths of an inch. (The contact here is not at AB, but at the left side of the block.)

An interesting, yet not uncommon, pattern is shown in Fig. 16. Here even the line of contact has been thrown awry by the irregularities of the surface, and now connects two obviously high spots, approximately spherical in surface form. When such a pattern as this is encountered, it is made much



THE TURRET LATHE Your Operator APPROVES! EASY TO OPERATE . ACCURATE . DEPENDABLE RIGID AND POWERFUL ENOUGH TO FULLY UTILIZE PRESENT DAY HIGHSPEED CARBIDE TOOLS

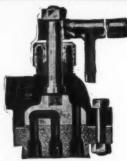




For bar stock up to 2" in diameter bed 12" turning length, 19½" swing over bed 12" turning length, 19½" speeds: 35 to 1500 RPM, Infinite spindle speeds: 3000 RPM MAY BE HAD WITH PLAIN CROSS SLIDE constant speed motor, 1200 RPM Also available in No. 3 Universal, 11/2" capacity
No. 2 Plain, 1" capacity ASK FOR DESCRIPTIVE BULLETIN

STOCK DELIVERY

MOREY MACHINERY CO., INC 410 BROOME STREET, NEW YORK 13, N. Y. PLANT: 4-57 26TH AVE., ASTORIA 2, NEW YORK



## NICHOLSON VALVES

## → Custom Constructed

DO SPECIFIC CONTROL JOBS BETTER, LONGER

Nicholson Control Valves are assembled from a choice of six different combinations of metals for body, seat, disc and stem, to suit your specific pressures and mediums . . . one reason why Nicholson Valves are today's "stand-outs" for efficiency and durability. For air, gas, steam, water, oil and other liquids. Pressures to 500 lbs.

Catalog 543 or See Sweet's

W. H. NICHOLSON & CO. 117 Oregon St., Wilkes-Barre, Pa.



Fig. 16—An interesting the not uncommon pattern is shown here.

simpler to interpret if we remember the earlier analogy to a contour map. Remember that the lines on the contour may connect all points of equal elevation, but that they may also show a sudden reversal of slope. That is what has occurred here. There are eight lines or rings showing, or seven between points A and B. But it is obvious that a reversal of slope has occurred somewhere along the line ZY, because all fringes curve away from the line. XY therefore is either the nominally flat surface of the object under study, with the surfaces sloping upward to two high "hills", one on each side, or else the hills are the nominal surface and the XY area is a low "valley" some 3-1/2 fringes, or 45.38 millionths of an inch deep. The only way to determine which section of the surface is the nominal one, and which is the erroneous, is to place a reference standard, such as a gage block of the proper height, under the flat alongside the surface being studied. The method of measurements with such reference standards will be gone into in detail when actual problems of measurement of and with gage blocks are considered in Section II.

#### Be Clean and Careful

Now that you have been given the rudiments of interpretation of interference band patterns and the outlines of measuring with them, little more needs to be told in this preliminary study. There are one or two points to watch in

# OME for TWO jobs



benchmaster OFFERS A
LOW-PRICED BENCH MACHINE
FOR BOTH HORIZONTAL
AND VERTICAL MILLING

benchmaster mill with horizontal spindle overarm

#### SAVES VALUABLE SPACE-CUTS DOWN EQUIPMENT COSTS

Now you can obtain a precision perfect, high-speed benchmaster milling machine that's easily convertible from a horizontal to a vertical miller by simply interchanging spindle attachments. Its unusual versatility, plus the usual quality-plus benchmaster workmanship, make this double-duty milling machine ap outstanding addition to your shop.

SPECIFICATIONS: Table size -6"x 14"—Three Tee Slots  $\frac{3}{6}"$ , 2" center Longitudinal travel  $8\frac{1}{2}"$ —Traverse travel  $5\frac{1}{2}"$ —Vertical travel  $8\frac{1}{2}"$  on vertical mill— $9\frac{1}{2}"$  horizontal mill—Height 28"—Weight (less motor) 215 lbs.—Requires  $\frac{1}{2}$  h.p. motor—Spindle speeds (standard 1725 rpm motor)  $450 \cdot 850 \cdot 1400 \cdot 2100$  rpm.

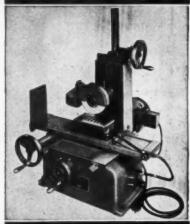
For complete information write to Dept. MT-9



MANUFACTURING COMPANY



# SANFORD



# High-Speed BENCH SURFACE GRINDER

ACCURATE WITHIN .0001

A sensitive machine built to rigid standards of accuracy and workmanship specially designed "For the job that fits in your palm."

WRITE FOR BULLETIN

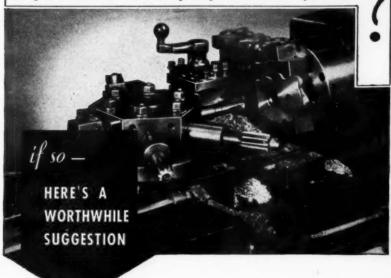
SANFORD MFG. CO. 1020-28 Commerce Ave. Union, N. J. using the flats, however. One is to clean both the working surface of the flat and that of the object under inspection as thoroly as possible.

The second is to use the flats carefully, for their surfaces are finished to the most accurate flatness of which man is capable today and any rough handling may mar or scratch the flatness and the surface finish. A little alcohol on a swab of cotton is about as good a cleaner as any. After the alcohol has evaporated, a small camel's hair brush may be used to brush away any specks of dust or lint that are left. The camel's hair brush may also be used on the inspection work, for the same purpose. Even very small dust specks may cause entirely erroneous interpretations and measurements when flat and work are put under the monochromatic light and the fringes appear.

Set the flat on the work carefully and squeeze down on it enough to push out as much of the entrapped air as you can and make your working angle as small as practicable. Never wring one optical flat to another, because you may never get them apart again or, if you do, they may be so marred and scratched as to be useless. Optical flats have been known to adhere with pressures as great as 650 pounds per cubic inch, some 45 times the pressure of the atmosphere.

One final point and rule: If you have trouble determining where the contact is or wish to change it, remember this:

Rule 6: Pressure on the low side, if there is contact, does not change the number of fringes. If there is no contact, it may increase the number of fringes and make them narrower until contact is made. Pressure on the high side whether there is contact or not will reduce the number of fringes (beAre you concerned with heavy duty turnet lathe operations



Cushman Heavy Duty and Extra Heavy Duty Chucks, designed and built "from the ground up" especially to meet the demands of modern turret lathe operation are equipped with American Standard 2-piece jaws and Serrated 2-piece jaws respectively. The construction of these precision chucks fully qualifies them for continuous service under heavy feeds and at high speeds with carbide tools. The two piece jaw equipment permits the use of formed soft blank top jaws...at a cost far below that of special jigs or set-ups...when irregular shaped work pieces are being machined. It is likewise easy and economical to change from one set of jaws to another without dismounting the chucks.

Whether your needs in work holding equipment are "standard" or "special" Cushman can supply a cost saving answer out of the long experience of our Engineering Department. Call upon us without obligation.

THE CUSHMAN CHUCK COMPANY . Hartford 2, Connecticut

A WORLD STANDARD FOR PRECISION



OUSHMAN OUSHMAN

You can depend upon your Cushman Distributor for expert, experienced assistance in the solution of your work holding problems. Call on him. For heavy duty counterboring requiring rigidity, strength and perfect alignment, choose Gairing's type C. The handy kit shown below, gives you a wide range of cutter and pilot combinations.

### **COUNTERBORE SETS**

Write for Folder and Prices

THE GAIRING TOOL CO.

Roosevelt Park Box 478, Detroit 32, Mich.



Sturdy box with hinged cover contains: holders C-12 and C-13; 20 cutters from  $\frac{9}{16}$ " to  $1\frac{1}{4}$ "; 28 pilots from  $\frac{9}{12}$ " to  $1\frac{1}{8}$ " and two  $\frac{7}{8}$ " countersinks, one 70° and one 82°.



cause it lessens the angle) and increase their width and the distance between them until parallelism has been reached (no angle between flat and work), when the fringes will vanish): then will reverse the procedure until contact has been attained on the other side.

(All photos and drawings in this installment, courtesy The DoAll Co., Minneapolis 4.)

(The next installment will begin the study of the various types of measuring machines available to instrument inspectors today.)

#### STUB SCREW MACHINE DRILLS

A recent circular on stub screw machine drills is available from the Chicago-Latrobe Twist Drill Works, 411 W. Ontario St., Chicago 10, Ill. This circular covers their full stock of ranges of wire gauge from No. 1 to No. 60, letter sizes from A to Z, and fractional sizes from 1/16" to 2". Both right and left hand construction is available. Data and prices of drills are given in tabular form.

## EFFICIENT TOOL DESIGNING

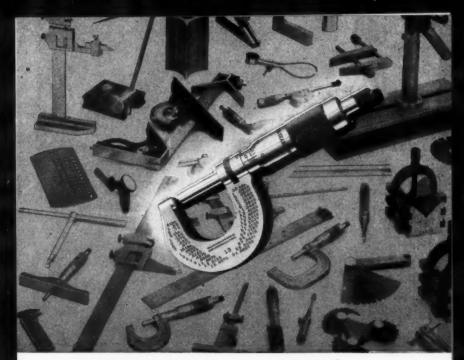
#### means better production at a lower cost

Efficient tool designing in post-war's competitive production is a "must". Our experience guarantees you tools—designed for economy of operation, resulting in your increased production at lower costs.

#### COLUMBUS DIE . TOOL

and Machine Co.

930 CLEVELAND AVE., COLUMBUS O ONIO



## Tools that give you "full measure"

All that a skilled machinist can possibly ask of fine precision tools, Brown & Sharpe tools provide in fullest measure . . . accuracy, reliability, sound design and fine finish.

Typical of this full measure of desirable characteristics are Brown & Sharpe Micrometers, known the world over for such worthwhile qualities as: wear-resisting measuring surfaces; fine precision screw and spindle; adjustable thimble, providing simple, dependable adjustment; easily read graduations and figures.

Nothing less than this full measure of Brown & Sharpe skill, knowledge and manufacturing integrity can give you maximum return on your investment in fine machinists' tools.

**BROWN & SHARPE MFG. CO.** 

Providence 1, R. I., U.S.A.



We urge buying through the Distributor

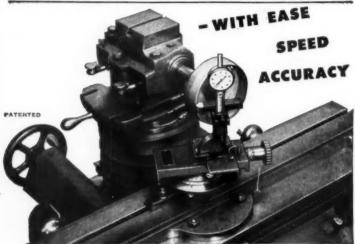


# BROWN & SHARPE TOOLS

# The Improved Meyers



FORMS CARBIDE TOOLS - OR HIGH SPEED TOOLS



Radiform set up to generate 3/16" concave radius on a carbide tool bit.

With the Improved Meyers Radiform, you can generate the form directly on tool bits, end mills, milling cutters and similar tools of high speed steel or carbide without first forming the wheel . . . and you can also form the grinding wheel itself. Micro-inch finish, with predetermined contours and clear-

ance angles accurately controlled, is easily obtained on the most intricate work. The Radiform is easy to operate and easy to install on your various machines... and it is now available for immediate delivery. So write or wire today for complete information and descriptive literature just off the press.

W. F. MEYERS COMPANY . ESTABLISHED 1888

# Saving Material with Contour Saws

By H. J. CHAMBERLAND

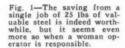
BAND saws having hardened teeth have two distinct applications. One concerns cut-off operations with the saw continually following a straight line. In the other applications the saw actually must do a machining job. When it comes to machining operations, the band is subjected to severe usage since it must follow more or less complicated outlines which involves radii or segments of circles varying in dimensions.

It is obvious that while any good quality hardened band will perform quite well in straight cutting, the real showdown takes place when the tool is faced with the strains of generating a curve. Realizing that tough alloys, 8 to 12" thick are now being cut regularly or otherwise machined by band sawing, it is highly important to select

a tool developed for maximum cutting rate, based on long life, and one that will maintain perpendicular accuracy.

The tool, regardless of its nature, is the decisive factor governing the efficiency of any machine, and band sawing equipment is no exception. There are a number of excellent band sawing machines in use which could be more widely utilized for actual machining, if they were equipped with band saws appropriate for the jobs. Bearing in mind that no better method with minimum tool cost and maximum material economy as its objective has yet been developed, no production or cost executive can give the matter too much consideration.

Of primary importance, of course, is a machine sufficiently rigid to be vibra-





tion-free and one incorporating dependable mechanism for a wide range of variable saw speeds. While the saw is the heart of the machine, efficient and well adjusted saw guides are truly the backbone of the saw.

It makes sense that if a band saw will cut 4" oil-hardening die steel at the rate of ¼" per minute and last 7 or 8 hours, it will surely cut some of the softer materials as if they were cheese. This is especially true of ductile materials which are really tough on the set and cutting edges of the average saw. The same applies even to straight-cutting castings or forgings to a thickness of eight to 12" so when the saw is navigating a two or three inch radius of such a thickness, it's taking plenty of hard knocks.

Band saws, now used to shape some 80 materials, ranging from sponge rubber to synthetic glass, are known as "contour saws." Before we consider the heat treating technique responsible for the cutting efficiency of the tools, let us consider a few facts and figures relative to their material saving properties.

The piece of steel shown being machined in Fig. 1 was not by any means cut off from a bar. This 4%" diameter by 6" slug was removed intact from a

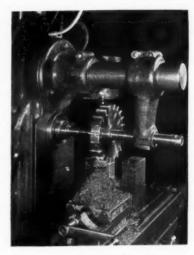


Fig. 2—From a general point of view, it is quite probable that enough material is reduced to chips in one year by milling to build a cruiser. This vast amount of waste can be substantially reduced by making more use of specialized band sawing machines.

500-pound forging, thus leaving a rough bore to be finished 4½" by conventional procedure. Therefore, in this particular case, approximately 25 lbs of high grade steel were spared from the chip pile. Of utmost significance is the fact that it happens to be the very size needed to be contour machined into a cam, as

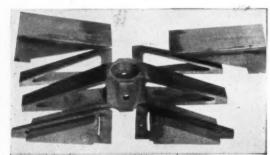


Fig. 3—The correct type of band saw can do wonders if given an opportunity. A little material saved here and there soon makes a ton in the aggregate.

shown. Since this cam will be bored similarly for a 21/4" hole, another 5 lbs of material is in the bag for further use.

With sawing applications of this nature, it is not so much a matter of time-saving as when the curvature is larger or of segmental form. However, the band saw is 15 to 20% faster than when drilling and boring, but one only has to balance the cost of material saved against that of labor and figure it out for himself.

What is happening in Fig. 2 is almost a shame to illustrate, but it's being done over and over again unintentionally, we hope. In milling six pieces of this kind (and incidentally for a milling fixture) more than 20 lbs of 1.10 carbon steel was unnecessarily wasted. Using a properly hardened saw, it requires no elaborate band sawing equipment to execute a job of this kind, since the stock is but 2" thick and labor cost would be about one-half that of milling.

An aircraft plant prefers the contour sawing method in making their experimental parts. At times a dozen or more must be machined and the claim is made that material thus saved brings labor cost down to a surprisingly low figure. The part shown in Fig. 3, center, is a forked bearing mount for a gov-

ernor. Note sawing technique followed to remove all eight sections to form the part.



Fig. 4—Five years ago, a 3" thick cut on steel with a band saw was almost a feat; today 30" material is no problem and this is not the limit.

The operation shown in Fig. 4 is done on a 24-hour production schedule and the parts are Diesel engine connecting rods, 12" diameter by 18" long and weighing 350 lbs. The material is .45 carbon steel, and the milling time was

### AT LAST! A PERFECT LIVE CENTER



PRICED AT ONLY

For No. 2 Morse Taper

LOOK FOR THIS GROOVE With added features galore at no added cost to you.

MORROW ENGINEERING CO., 1132 E. Firestone Blvd., Los Angeles 1, Calif.

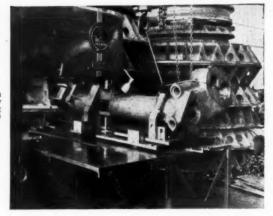


Fig. S—Two and three ton castings or forgings are now regular band saw machining applications, and require proper equipment.

eight hours as compared to 2½ hours with sawing. The four pieces of steel removed from each rod weigh approximately 50 lbs and this material is certainly worth conserving. In taking a

two-directional cut 12" high, the saw must have some unique properties to deliver perpendicular accuracy as well as squareness with a precision of within .003".

### **MACHINE TOOL DRIVES**



# WITH SELECTIVE SPEED GEARED TRANSMISSION

"It's the transmission that makes the drive."

There is a model DRIVE-ALL for all kinds of machines requiring either one or several speeds—including automatic screw machines.

COMPLETE MOUNTING BRACKETS.

Write for complete information.

DRIVE-ALL MANUFACTURING CO. 3400 Conner Detroit 14, Mich.



\* SEND FOR LITERATURE

U. S. HOFFMAN MACHINERY CORPORATION COOLANT FILTERS · FILTRATION ENGINEERING SERVICE

Of course, the ball-bearing auxiliary table designed purposely for this job helps materially in reaching a high degree of precision but the saw is what really turns the trick.

The next important objective in utilizing the contour sawing method more extensively, is for releasing a number of basic machine tools at a time when they are needed otherwise. A typical example of this is shown in Fig. 5 where an anti-aircraft gun bracket is being contour machined. This job formerly tied up a \$50,000 miller which could be operated to greater advantage on other work.

Fig. 6, top:—A plant specializing in die production reports that 900 lbs of steel were saved in a single month by the application of the correct band sawing technique. This plant produces many dies of the blanking variety by sawing at a predetermined angle and utilizing the slug removed from the die to serve as the punch.

Center:—A contract shop saved 60 lbs of valuable armor plate by circular sawing out three openings in 40x%" discs.

Bottom:—Spinning and band sawing not only saved much material in making the parts shown, but reduced production cost 50%. Spinnings are sawed in four sections by cutting off 10 simustaneously.



Fig. 6—Typical examples of material economy with contour saws as cutting tools. Top: Blanking punch and die work; Center: Disc cutting; Bottom: Stacksawing.

Contour saws are the product of a scientific heat treating technique where-by tooth hardness depth is constantly under control. Exhaustive laboratory tests have definitely determined that long life in metal-cutting band saws is



## MARTIN ROLL FEEDS FIT ALL BENCH TYPE PUNCH PRESSES

Permit High Production at

Extremely Low Capital Costs!

Save in original Die Costs. Precise indexing eliminates half holes. One operator can tend several presses. Available for immediate delivery. We also specialize in the manufacture of Small High Production Dies.

Quotations given promptly upon receipt of prints. Write for descriptive literature or ask your dealer.

RESCO 2020 SANTA FE AVENUE

in greater part due to hair-line control of depth of tooth hardness. Repeated tests performed with every make of the highest quality saws support this claim without any fear of contradiction.

A band saw properly hardened has a very rigid tooth extending to the bottom of the gullet, where the hardness must necessarily end. At this very point flexibility is increased and allows a very free movement for the tooth so it will not break when the band is subjected to side pressure.

The amount of force required to bend a tooth at the gullet line is equal to the force required to break it, meaning that maximum tooth rigidity is possible only by controlling the hardness depth

of the tooth.

If the hardness is too deep and sufficient side pressure is applied, as when generating a radius, the tooth cannot bend nor can any bending take place at the gullet line. It therefore follows

point, rip out a few adjoining teeth and eventually carry off a part of the band. Too deep a tooth hardness also causes small cracks in the gullet which gradually penetrate to such a depth as to cause the teeth to lose their set quickly. The source of this trouble is the constant flexing of the band and its normal stretch when subjected to high sawing load. This is a condition that cannot altogether be avoided.

If tooth hardness depth is too shallow, meaning a hard tooth tip and soft base, this condition is even worse than excessive hardness depth. In this latter case, the teeth of such saws will immediately lose their set even when

taking straight cuts.

It is safe to assume that the heat treating procedure referred to has a "differential" angle. This is true indeed because five varying degrees of heat are applied between the back edge of the band and the extreme tip of the tooth.





### GRIPPING FORCE 15 TIMES AIR LINE PRESSUREI

Seeking faster production methods, busy plants have discovered new, powerful Speedy Air Vises! From a single vise to an installation of fifty, they cut time, money and labor costs. Air operated, foot-controlled, both hands are left free for more rapid drilling, tapping, light milling, assembly, etc. Complete with Foot Control Valve, Air Hose and Fittings, only

ORDER FROM YOUR MILL SUPPLY DEALER OR WRITE DIRECT



W. R. BROWN CORP., 5720 ARMITAGE AVE., CHICAGO 39, ILL.

# Carbide Tool Misconceptions

By HARRY CRUMP\*

A NUMBER of erroneous beliefs about the limitations of carbide tools were proved, during the war, to have been psychological rather than actual in nature. Once these misconceptions were discarded, carbides quickly found a greatly increased field of usefulness. Whereas, not so many years ago, people asked, "Can we use carbide tools on this job?" the question now is, "What kind of carbide tools should we use?

Chief among the misconceptions which have been eliminated are:

1—That carbide tools could not be used on old machines.

2—That carbides were no good for steel cutting.

3—That special carbide tools had to be designed for each new application.

4—That carbides were no good for milling.

5—That carbides were difficult to resharpen properly.

6—That carbides were more expensive than corresponding tools made of other materials.

Most universal conception, perhaps, was that carbide tools could not be used successfully on old or worn machines. War production showed that older machines can be used successfully merely by tightening spindles and bearings; eliminating excessive vibration under actual operating conditions; etc.—corrections any good maintenance man can make. In some instances negative rake tools were used to compensate for backlash in the machines.

Another early misconception was that carbides are no good for steel cutting. Today, of course, advantages of carbides are recognized as being of even greater importance in steel cutting than for other types of metal cutting. It is common knowledge that carbide tools were largely responsible for the greatly increased production of war material from all kinds of steel, including the hardest of the alloys and even cast armor plate.

General adoption of standard carbide tools has exploded the myth that all carbide tools had to be specifically designed for each new application. Standardization of grades, tool forms, and

\*Chief Tool Sales Engineer, Carboloy Co., Inc., Detroit.



cutting angles has progressed so far that an estimated 60% to 80% of all single point turning, boring, and facing operations can be handled with 10 standard tool types.

Most persistent misconception was that carbide milling cutters would not work satisfactorily on steels. Yet one of the most remarkable advances in metal cutting in the past few years is along this very line. Steels of 170-200 Brinell hardness are being milled regularly at 500 SFPM and even higher speeds. Steels of 450 Brinell are being milled at 250 SFPM and higher. On certain applications, aluminum is being milled at speeds upwards of 12,000 SF PM. Available spindle speeds seem to be the main limiting factor as far as cutting speed is concerned when milling aluminum alloys, rather than anything inherent in carbides.

As for the belief that carbide tools are extremely difficult to resharpen—it has been learned that carbides are

not difficult to grind if proper equipment is provided and normal care is taken by the operator. Installation of central grinding rooms where trained operators run the grinders used for carbides has helped cure bad grinding practices.

As to cost, it is true that at one time carbides were somewhat more expensive per tool than conventional tools (although lower per piece produced), today the original cost of carbide standards actually compares favorably with the cost of other cutting tools. In general, the larger the tool the more favorable the cost comparison. Moreover, the longer production life of carbides makes the machining cost per piece far below the cost when machined with other cutting tools.

With the elimination of these and other misconceptions carbide tools have become generally accepted thruout the metal cutting industry for practically every kind of metal job and also for

### PATENTED ROTARY VACUUM PUMPS

PRESSURE BLOWERS, GAS BOOSTERS AND COMPRESSED AIR MOTORS
VACUUM TO WELL OVER 29 INCHES MERCURY
PRESSURE TO 25 LBS.

THEY TAKE UP THEIR OWN WEAR

Complete Motor Driven Units or Bare Pumps



QUIET POWERFUL EFFICIENT

> SENT ON FREE TRIAL

GET ONE FOR FREE TRIAL

SUBMIT YOUR PROBLEM TO US

LEIMAN BROS., Inc. 173 CHRISTIE STREET

machining wood, plastics, concrete, etc. It is estimated that better than half of all "metal removed" in this country is machined with carbides today.

However, the limit of the effective use of carbides has not yet been reached. So far, all that we have done is to learn that carbide tools—correctly used—are simple to apply and cut production costs amazingly. At the same time we have also learned more about the proper use of high speed steel tools because good carbide practice also constitutes good high speed steel tool practice.

#### DISINTEGRATORS

The June issue of BLUE BOOK carried a story of Disintegration Equipment, mentioning among others the units formerly made by Electro Tool & Engineering Co. This company has now been dissolved and the product formerly made by them is now produced by Ansaldi Tool & Engineering Co., 4777-12th Street, Detroit 8, Mich. Their Disintegrator is still called the "Electro-Tool."

#### CONTRACT PARTS SERVICE

A new contract parts service, said to be entirely different from any now available, is offered by Square Surface Plate & Tool, Inc., 18950 Woodward Ave., Detroit 3, Mich. An outstanding feature of this service is the ability to produce difficult multi-diameter parts of virtually any length at low cost.

The basis for the service is specialized swiss - type equipment embodying the principles usually found only in a swiss type forming machine. By means of this attachment, which goes on any lathe, the company claims to be able to produce parts from a needle point to 5%" diameter to almost any form with semi-skilled or unskilled labor.

The form to be produced is ground on a small flat cam which is inserted into the machine and serves as a feed guide. By storing the cam for each job, it is possible to duplicate any job literally at a moment's notice. Any kind of cold finished stock can be used.

An illustrated brochure, outlining the service and explaining the step-by-step operation of the machine, may be obtained by writing to the company.

### ATLAS and VULCAN

UNIVERSAL JOINTS NOW IN STOCK



The ATLAS



The VULCAN

The ATLAS Universal Joint, precision made completely from heat treated Alloy steels, has been serving industry for twenty years. The Vulcan Joint for use on Hoists, Power Take-offs and similar Equipment. There is no job too severe for the Vulcan. Featuring Alloy Steel drop-forged ends and oversize grease reservoir.

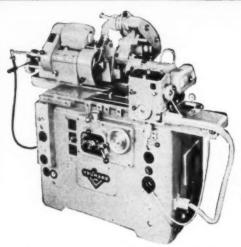
WRITE FOR CATALOGS.

### THE GRAY AND PRIOR MACHINE CO.

620 Windsor Street

Hartford 5, Conn.

Our west coast Representative: Link-Belt Company, Los Angeles, San Francisco, Portland, Seattle and Oakland.



### VOUMARD

MACHINES CO. S.A. La Chaux de Fonds Switzerland

### VOUMARD AUTOMATIC

and semi-automatic Internal Grinding Machine

Especially recommended for small as well as quantity production of blind traversing, plain or grooved bores.

A flexible unit particularly suitable for high accuracy.

Automatic plug gauging; the most accurate known.

Interchangeable gauging devices.

Hydraulic control. Adjustable Stop. Automatic hydraulic recessing etc.

# MAVEG MACHINE SALES ASSOCIATION NEW YORK 7, N. Y.

Tel. WHITEHALL 4-3455

We are also sole agents in the United States for the following well known Swiss High Precision Machine Manufacturers:

BILLETER UNIVERSAL AUTOMATICS

BRAECKER FILING MACHINES

BURRI S.A. PRECISION SMALL PARTS

COMPAC, ANTI-SHOCK COMPARATORS

**EXACTA. PRECISION MEASURING TOOLS** 

GLOOR & CO., ELECTRO ENGRAVING MACHINE & APPARATUS

WOLF DIE THREADING MACHINES

ZENITH S.A. PRECISION CENTERING MACHINE AND PROFILE GRINDERS

ZYMA JIG BORER

# **Beading for Sheet Metal Guards**

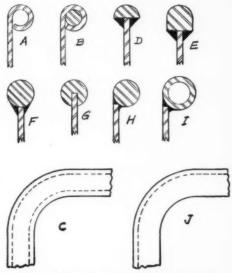
By H. F. WILLIAMS

To trim, finish and strengthen the raw edges of sheet metal guards, splash fenders, pans and other shapes used in conjunction with machine tools and other mechanical contrivances, a beading in some form is used. In the common galvanized pail, made of comparatively light material, it is observed that a strengthening effect is necessary to have the pail retain its shape.

Where the machinery is available to form rolls at the edges of the sheet metal, the results are as depicted at A in the accompanying sketch. However, this is done in some variation from a half round, % round to a complete round as shown.

As in the case of the pail mentioned, at B is shown a complete roll, the metal having been formed over a wire.

This might be necessary in so-called "tru" members, but when sheet steel of greater thickness is used, such reinforcing becomes unnecessary. Manufacturer's Standard Gage numbers 14, 15, 16 and 17 are commonly used for the items mentioned. These gages have thickness of .0747, .0673, .0598 and .0538" respectively.



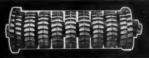
When these thicknesses of metal are used for rolled edges, straight-away or flat pieces are not so difficult to manufacture, but when radiused bends are required as shown at C, there is a tendency for the round bead to flatten. This is, of course, relative to sketch A. It has been debated as to the advisability of placing any form of beading

### CUT YOUR COSTS! (THE EASY WAY)

Send your cutting tools in today for Sharpening, Salvaging, Reconditioning

SAVE UP TO 70%

Rutland



TOOL SERVICE DETROIT 3, MICH. along the top or outer edge of formed sheet metal pieces. It can be said that if the metal is of sufficient thickness and the finished article is stationary or permanently fixed, the fastened ends give it added rigidity. Such pieces will withstand considerable distortion even tho the span is of same length. And then too, stiffness is inherent in the heavier gages of metal. Ail that is required is to have comparatively straight edges with corners broken with a file or even finished off with a concave cutter leaving a half round edge.

However, when such pieces are of the removable type, for instance splash guards resting on clips without the benefit of screw fastenings, then beading in some form is necessary. Half round wire is used in the illustration at D. It is simply set on the edge of the sheet metal and tack welded at intervals to keep it in place. Thereafter it is either welded or brazed at about 45° as shown and buffed off smoothly. At E is a modification of D in that the shape of the beading is different. It is considerably heavier in cross section.

The next sketch at F makes use of round wire but attached in a similar manner. The welded joint will not be quite so heavy as at D and E, but the wire is located centrally on the sheet steel. When welding is not resorted to, a slot is cut into the wire, in this instance wire of 1/4" diameter is used. and the sheet metal inserted therein as shown at G. It can be held in place snugly but tapping with the peen end of a machinist's hammer, all along or even intermittently on the wire. If the wire can be tack-welded at intervals, it will hold somewhat more securely.

To simulate the beads at A and B more closely than the methods shown at D, E, F and G, the method at H is sometimes used. The sheet can be laid flat on a plate or table and clamped fast if necessary. The wire or rod is then rolled against the edge of the sheet metal and also clamped down. The inside edge of the rod is then tack-welded or if preferable, completely seam-welded as shown. When unclamped from the table, the remaining groove on the out-



side is welded shut. Thereafter it is rough-ground and buffed smooth. The result is a very permanent edging with a streamlined appearance as the overhanging side of the rod is toward the inside or away from the observer. This flushness deceives the eye as it really looks like a rolled edge. It is, of course, heavier than the rolled edge, but of the same weight as the wired rolled edge. However, depending upon the size of the finished piece and the length of span it is required to cover, ¼, 5/16 or even ¾" diameter wire beading is commonly used.

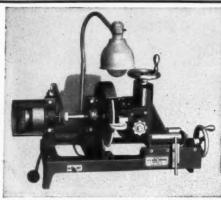
When extreme lightness is required, or in any event when as little weight should be added as possible, black steel pipe or tubing is sometimes used for the beading as illustrated at I. When pipe is used it is chiefly ½" pipe with an O. D. of approximately 13/32". However ¼" pipe has been successfully used on large pieces, this pipe being about 17/32" outside diameter. In the latter instance, the welded joints became a trifle heavy. The black scaly

surface of the pipe is buffed off after the welding operation.

In both cases where methods shown at H and I are used, curves as shown at J are easily made. The pieces are curved separately to the same radius at the outer edges. Tack welding holds the two pieces sufficiently well even tho the radius is of large dimension. These temporary tacks can be loosened if improper fitting was made and thereafter completely welded when everything is satisfactory.

#### PRECISION BORING COMPOSITION

Kennametal Inc., Latrobe, Pa. has developed a very hard Kennametal composition, Grade KSH, specifically for small tools used in precision boring of steel parts. It has a Rockwell A hardness of 93.2, great resistance to cratering (high content of tungsten-titanium carbide, WTiC2), and is unusually strong for such a hard material. Solid tools 3/32" to 5/16" diameter, and 5/32" to 5/16" square, are available, as well as blanks 3/32" to 3/diameter and 3/16" to 3/m" square, suitable for grinding to any desired tool point shape.



COMPLETE GRINDER as shown in photograph no motor now requires one quarter HP 1750 RPM. A Special Machine for a Special Purpose "Resharpen Dull Pipe Wrenches".

# SPECIAL Grinding Machine

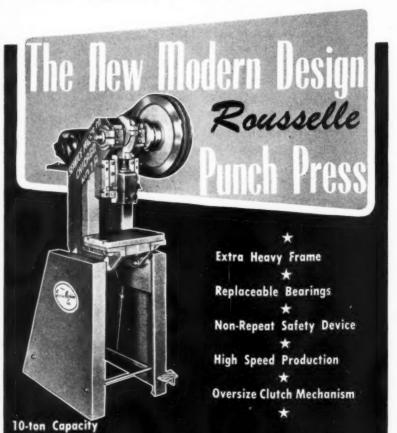
Grey Iron Castings, Two tone Enamel finish Grease sealed Boll Bearing Mondrel Pulley and Belt on mandrel Variable pitch motor pulley Built in & ready wired motor switch Adjustable Light Wire cleaning brush

Adjustable Light
Wire cleaning brush
Face grinding wheel
5 special Grinding Wheels for 6
inch to 48 inch wrench laws
Special patent wheel mounting
Patent spacing 4, 5, 6, 6½, 7,
8, 9, 10, & 12 per inch

Other accessories
Special holder for all Handles
(No rivets to knock out)
Mandrel Spanner Wrench
2 "Allen" Wrenches
1/2" square Abrosive Stick
Mounted Diamond Wheel
Dresser & 3 guides

## J. C. MOORE INDUSTRIES FREDONIA, PENNSYLVANIA

Service Machine Co. Presents



# Service Machine Company

7633 South Ashland Avenue

Chicago 20. Illinois

# LATHE CHUCKS

### 4-JAW INDEPENDENT LATHE CHUCKS

Accurately ground, hardened steel, reversible faws have wide gripping surface. Heavily ribbed, semi-steel body withstands unusual strain. Oversize, tough nickel steel screws have accurately cut equare threads. Steel thrust bearings assure durability.

10"	Size		\$39.35
12"	Size	**********	43.85
14"	Size	**********	50.40
16"	Size	**********	66.25
18"	Size	**********	87.75



### L-W 3-JAW UNIVERSAL LATHE AND SCREW MACHINE CHUCK

for light or heavy duty work, Guaranteed to run true. Accurately fitted, hardened and ground male and female reversible jaws. Rugged, semisteel cast body. Accurately cut high grade steel geared scroll and pinions.

61/4"	size\$45.	00
71/2"	size\$55.	00
101/2	' size\$83.	35

Send for complete catalog giving prices and specifications on these quality, low-cost L-W Products



L-W CHUCK COMPANY 2350.ST. CLAIR ST. TOLEDO 4. OHIO





Come to headquarters for the greatest variety of topquality accessories available . . . mounted and grinding wheels in all grades, grains, shapes and sizes... tool and cutter wheels . . . cups . . . internal wheels ... wheels for center lapping machines ... drum sanders and bands . . . wire brushes . . . felt and rubber polishers . . . miniature cutters.

You'll find ALL your requirements in the famed CHICAGO Line!

FASTER CUTTING ACTION - Pace setting CHICAGOS, backed by half a century of experience, are skillfully engineered to turn out work in less time; to increase production per man-hour, cut time, cut costs!

FREE CATALOG — 64 pages of illustrations of wheels and other equipment, many in actual size and color. Write for copy today.



### CHICAGO WHEEL & MFG. CO.

1101 W. Monroe St., Dept. HB, Chicago 7, III.

Send Catalog. Interested in.

Out of this World!"

Perhaps you've never heard this expression applied to production equipment, but "out of this world" is how Mr. Gatherer sums up his comments on Elmes press performance.

"We're very well pleased," says Mr. Gatherer. "The press is doing a beautiful job. Convenient adjustments, full automatic 'inching,' and closure to six inches of daylight have greatly reduced our set-up problems.

"Delayed independent action of the air cushion return which prevents possible damage to the unsupported shape, precise automatic control, selective pressure, stroke, and speedsand exceptionally fast operation-have improved both our production and our products.

"For our work of deep drawing and spinning steel, stainless steel, aluminum, and brass our new Elmes 100-ton hydraulic is the most capable and versatile press we've seen. We blank and draw in one operation. It's really marvelous equipment-out of this world!"



on the Elmas Press

Write today for all the facts about this press that does everything with the speed and ease you usually associate only with special-purpose designs. Built in the full range of sizes and capacities.

ELMES ENGINEERING WORKS OF AMERICAN STEEL FOUNDRIES 244 N. Morgan St., Chicago 7, 111.

Also Manufactured in Canada



# CARBIDE MANDRELS Their Care and Servicing

By A. E. GLEN\*

THE ever-increasing use of carbide dies and mandrels for the production of tubing made from plain, alloy and stainless steels; brass; bronze; aluminum; cupro-nickel; and aluminum bronze has brought with it a need for a wider understanding of the importance of correctly using and servicing these tools. These hints on the use and care of carbide mandrels have been compiled in the interest of increasing mandrel service life; obtaining better inside finish on tubing; maintaining closer tolerances on long runs; providing more continuous operation; and decreasing rejections.

A Carboloy mandrel is a precision tool. To obtain maximum results, it should be accorded the same care and consideration given any other precision

\*Carboloy Co., Inc., Detroit

tool. Proper use and servicing, however, is no more difficult or complicated than that of any other precision tool employed in production work.

Component parts of a Carboloy mandrel (Fig. 1) are (a) the cemented carbide nib which may be either straight or tapered, mounted on (b) a hardened steel stud and drawn up tight to a straight steel shank (c). These mandrels are supplied finished and ready for use in the tube mill; or may be made up by obtaining finish ground, semi-finished, or rough carbide nibs for finishing and assembling as required.

An important factor in carbide mandrel usage is that all tubes should be so pointed that the reduced portion of the tube blends into the larger diameter with a radius rather than an angle (Fig. 2). This tends to lessen the shock on

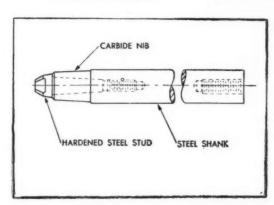


Fig. 1—Component parts of a Carboloy mandrel are a carbide nib mounted on a hardened steel stud and drawn up tight to a straight steel shank.



TOOLROOM BOTTLENECKS

### with Speedy JOHNSON Units!

Harden high speed steels, tools, dies and small metal parts quickly and at LOW COST.

JOHNSON No. 120

1500° F. in 5 Minutes

2300° F. in 30 Minutes

A low est unit that is uncertainty high speed steels... It is high speed attels... It is high speed steels... It is speed attels... It is speed attels... It is speed attels... It is speed attels as a speed attels. It is speed at the speed attels as a speed attels. It is speed attels as a speed attels as a speed attels as a speed attels. It is speed attels as a speed attell as a speed att

Write for Literature and prices on all Quick Acting Johnson Units

\$129.50 F.O.B. Factory

JOHNSON	GAS	<b>APPLIANCE</b>	CO

570 E. Avenue N. W., Cedar Rapids, Iowa Please send Free literature on all Quick Acting Johnson Furnaces

Name	***************************************
Address	

City ..... State......

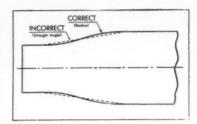


Fig. 2—Pointed end of tube must be opened to permit a free flow of both acid and lubricant,

the carbide nib and makes for longer life of the equipment. All hot pointed stock should be pickled to remove the abrasive crust of scale formed by heating. The pointed end of the tube should be open. This eliminates formation of air pockets and thus permits a free flow of acid and lubricant over the entire inside surface of the tube.

Proper annealing of tubes is desirable to obtain optimum economies and maximum mandrel life. Best practice is to anneal tubes, if possible, after each

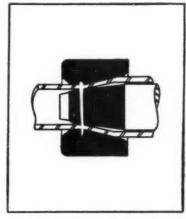


Fig. 3-Set tapered mandrel into die just enough for correct size.

### SHAPE-RITE SHAPERS – PRESS-RITE PRESSES KELLER POWER HACK SAWS



### PRESS-RITE PRESSES

Now built in three sizes: 5 ton, 10 ton and 18 ton, open back inclinable models with extra large die space clearances, latest design, simple and rugged construction, durable and dependable.





#### SHAPE-RITE SHAPERS

Designed to handle any class of work within the limits of eight inch stroke shapers. Precision built for precision work and will give years of satisfactory service.

### KELLER POWER HACK SAWS

Built in several models from small bench type to 634'' x 634'' capacity Hy-Duty model. Cut your cutting costs with Keller Saws.

FOR COMPLETE INFORMATION
SEE YOUR LOCAL DEALER
OR WRITE DIRECT TO US.

SALES SERVICE MACHINE TOOL COMPANY
2426 UNIVERSITY AVENUE ST. PAUL 4, MINNESOTA

### SOMETHING NEW IN 3-WAY PARALLEL SET-UP BLOCKS

One Handy Set Speeds Set-ups To 12 Different Heights



This handy, compact set of Moore 3-Way Farallel Set-up Blocks takes the place of a large number of conventional parallels. Each block may be used in any of its three dimensions to build up to 12 different heights.

Spaced around the work-piece to provide support, parallel or perpendicular to working surfaces, they eliminate sagging, localize stresses and hold work rigidly throughout the machining operation. And they may be placed to avoid interference with holes being bored or ground.

Moore 3-Way Parallel Set-up Blocks are carburized chromenickel steel, finish-ground to +.0002"-0000". Sides are parallel within .0001", perpendicular within .0002". Write for descriptive literature.

MOORE SPECIAL TOOL CO., INC. 728 Union Ave. • Bridgeport 7, Conn.

MANUFACTURERS OF MODRE JIG

pass. Improper annealing invariably will result in tubes that are too hard, spotty, or otherwise below standard. Such tubes have a tendency to chatter while being drawn. Chatter eventually causes pickup and scratches on interior of the tubing and also causes excessive heating of the mandrel. Excessive heating sets up strains in the nib which in time will cause small surface cracks. These may lead to complete failure of the mandrel. Thus, mandrel life can be lengthened: costs lowered; and more continuous draw bench operation obtained by the proper annealing of the tubes.

Carelessness during pickling and cleaning of tubes can cause scratches on tubing which may put excessive pressure on the mandrel, resulting in failure of the tool. Even one bad tube can materially decrease the service life of a carbide mandrel.

Tubes should have a light etch rather than a smooth surface on the interior. An etched surface will hold the lubricant better than a smooth surface, giving a more uniform drawing surface which reduces friction and eliminates scratching and pickup. Etching too deeply causes "acid burn" which may harm the mandrel, whether it is of carbide, chrome plated steel, etc.

Correct lubrication is extremely important in tube drawing. Improper lubrication results in metal-to-metal contact which creates excessive heat. If allowed to continue, this heat will eventually cause the lubricant to break down. When that happens, the carbide mandrel picks up and starts scratching the tubing. When pickup occurs, the amount of heat generated is frequently enough to turn the mandrel blue. The heat may also cause surface cracks to appear on the carbide nib. Their ap-

# Avey FEATURES SLIDING GEAR CLUSTER

The Avey Type MA-6 is made in the following capacities

No. 2— %" capacity in cast iron No. 3—1 4" capacity in cast iron Any spindle of MA-6 can be arranged with any one of above FEATURES giving ease of operations—ideal for production set up.



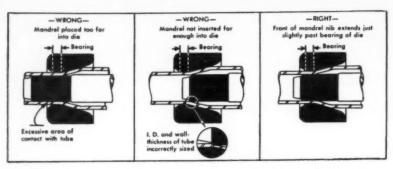


Fig. 4-Set straight Carboloy mandrel into die so that end of chamfer extends just slightly past the bearing.

pearance is usually followed by small particles of carbide falling from the nib and eventually by complete failure of the mandrel.

To lubricate, place back end of tube in lubricant tank first. Gradually submerge entire tube. If done correctly, this expels all air and permits complete coverage of lubricant over interior surface of tube. If pointed end of tube is closed, cut it off and re-point tube, to provide an opening so the air can escape.

Correct draw bench alignment is important in obtaining optimum benefits



Positive, Dependable Repeat Readings

When measuring outside diameters it frequently becomes advantageous and time saving not to have to move the items to be checked. The weight of the items or the setup in the machine may make it inconvenient. To enable checking at the machine we have produced the Mikrosnap which consists of Mikrokator Number 220 with a scale range of .006 and graduated in .0001 set in snap gage frames. For those desiring a closer reading a scale range of .0024 graduated in .00005 can be had. Mikrokator Number 220 is interchangeable in 5 different frames with ranges of two inches to each frame making a total diameter of 0 to 10" capable of being checked. It can be set direct with Johansson Gage Blocks to any desired size thus giving direct reading instead of "feel" as with snap gages.

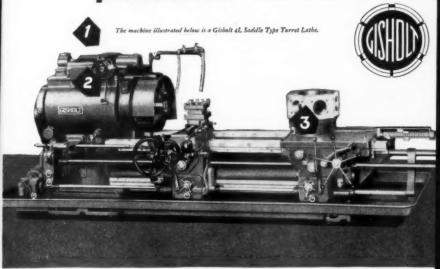
WRITE FOR

SWEDISH GAGE CO., OF AMERICA

# 3 ways to increase production

Actual cutting time on a turret lathe is usually determined by using the maximum speeds and feeds the cutting tools will withstand. Isn't it true, therefore, that the greatest opportunity for time-saving is in cutting the lag between cuts?

By substituting automatic operation for certain manual motions, Gisholt Turret Lathes have made it possible to increase the percentage of actual cutting time in relation to the complete cycle. This means increased production—lower machining costs.





Spindle speed changes can be made instantly without stopping the spindle or re-

leasing the main drive clutch. The Gisholt Hydraulic Speed Selector, power operated, eliminates manual gear shifting. It may be operated either direct or pre-set.



Hydraulic spindle control provides for starting, stopping or reversing by a mere touch of

this handy lever. When in neutral position, braking is automatic, bringing the spindle to a quick, smooth stop. Headstock control is as easy as pressing buttons.



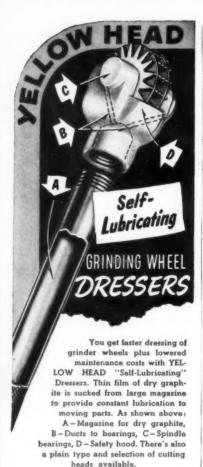
Power rapid traverse for both hexagon and square turrets insures quicker

movement of tools in and out of cutting position. With transverse travel of the cross slide, time savings are substantial on many jobs. Operating effort is reduced to a minimum.

LOOK AHEAD...KEEP AHEAD...WITH GISHOLT

### GISHOLT MACHINE COMPANY

1185 E. Washington Avenue · Madison 3, Wisconsin



CITY MACHINE CO., DEPT. MT



Write

for complete details and prices from carbide mandrels as well as other types. Have the die lined up accurately with the grip-and-pull carriage in order to draw the tube on-size and straight. Improper alignment produces bowed and off-size tubing. The mandral rod must be properly aligned and in line with the die. An off-center mandrel rod puts unnecessary strains on the mandrel, especially when back end of tube is passing over the mandrel.

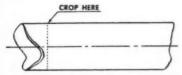
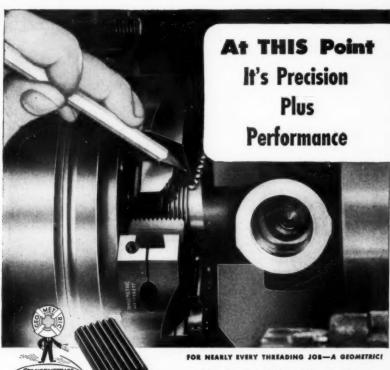


Fig. 5-Trim back end of tube when excessive scalloping develops.

When setting up a carbide mandrel, it is important that the mandrel be set in the correct position in relation to the die. Slightly different practices are required for tapered and straight mandrels, as shown in Figs, 3 and 4.

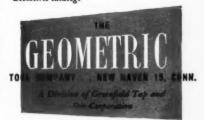
When setting a tapered mandrel, adjust it just far enough into the die to produce the correct size (Fig. 3). The setup should be checked to make sure that the tubing does not start to reduce on the steel shank in back of the carbide nib. If this occurs, wear marks will show after drawing. Experience to date shows that tapered mandrels are more efficient than straight ones. Ample clearance of the mandrel's point is automatically provided by the taper after the inside diameter of the tubing has been sized. Area of contact is also reduced with tapered mandrels. This helps maintain efficient lubrication.

The straight mandrel should be set into the die so that the end of the mandrel's chamfer extends slightly past the



And it's right here, says the machine operator in this leading valve plant, that we can count on GEOMETRIC for threading results. At this point the Geometric Die Head takes over and does any external threading job with precision and maximum production. In the above photograph, it is a Style TR Geometric Self-Opening Die Head fitted with "Tangemetric" (Tangent) Chasers. This Die Head is for rotary use and is available in three sizes having an over-all capacity of  $\frac{1}{6}$ " to  $1\frac{1}{2}$ ". There are other styles and sizes of Geometric Die Heads for nearly every threading job—rugged, easy to operate, and precise.

If you have in mind a particular threading problem, we will be glad to have our engimeers give you their recommendations, hased on over a half century of specialization in this field. Why not let us send you the latest Geometric catalog?



FOR NEARLY EVERY THREADING JOB - A GEOMETRIC!

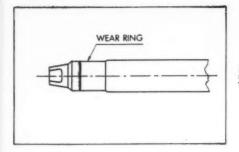


Fig. 6—Service carbide mandrels as soon as rings and wear marks are visible.

bearing (Fig. 4). When a straight mandrel has been properly set, its surface will show evidence of contact with the tube at a point from 5/16" to %" away from end of chamfer on the mandrel. If a straight mandrel is extended too far thru the die, too much of the mandrel's carbide surface will be in contact with the tube's interior. This condition may cause pickup due to unnecessary

friction and strains on the mandrel. However, if the mandrel is not set far enough into the tube, it is virtually impossible to get the tube to start.

It is well to make certain the tube does not strike the mandrel's end too forcibly when the tube is being pulled over the mandrel rod prior to drawing. Constant pounding on the mandrel's



## v BREAK 'em

### HOW MUCH DOES IT COST YOU TO REPLACE BROKEN DRILLS, TAPS, REAMERS, ETC.?

Added to losses due to work spoilage, labor of extracting broken pieces and production line tie-ups, it can be a formidable total.

You can cut these mounting losses easily by the use of BUFFALO TORQUE CONTROL COUPLINGS. Adjusted at a fixed torque to perform a particular operation, these couplings automatically throw out when overloaded, thereby releasing the driving power thru the couplings themselves, but automatically re-engaging and re-assuming the driving power when the over-load has been removed.

Available in production and utility models, in sizes for all operations on drilling machines, lathes, turret lathes, boring mills, etc. Also manufactured as stud drivers, nut setters and transmission types.

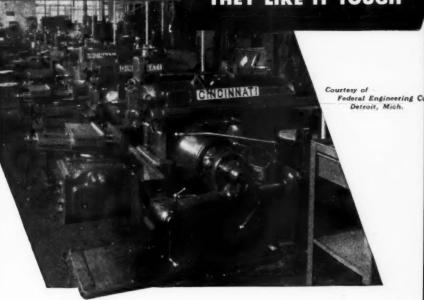


Machine Tool Type Production Model

Descriptive Bulletin No. 1007 sent on request

BUFFALO MACHINERY CO., INC. 838 Grant Street Buffalo 13, New York







In the large tool and die shops of industry . . . day in and day out . . . standards are tough. The die steels are tough, and performance demands are tough.

Powerful, sturdy Cincinnati Shapers are found in these shops, for they are dependable on the tough job.

> Write for Catalog N-3 for complete details on Cincinnati Shap



GRIND RECESS IN CARBOLOY recess in nib as shown. REGROUND STRAIGHT MANDREL

Fig. 7-When straight man-drel wears undersize, grind

end may cause the carbide to chip off the front end, offering a starting point for longitudinal cracks in the nib. Tubing should always be trimmed regularly. After a tube has been drawn thru several passes, the elongation will cause a "scalloped" back end to form on the tube. Fig. 5). Quite a bit of stress is set up when such a tube is drawn

over the mandrel. Moreover, the mandrel is twisted at the instant the "scalloped" end of the tube leaves the nib. Therefore, if the back end of the tube is regularly trimmed before "scalloping" becomes too pronounced, the life of the carbide mandrel will be materially lengthened.

### MORE SPEED PROTECTION MORE SUPPORT NEW **CUT DOWN** COSTLY BLADE BREAKAGE -STEP-UP **BAND-SAW PRODUCTION!**

PADDOCK BALL-BEARING BAND SAW GUIDES hold the working portions of your saw-blades as if they were in a frame - free from friction. Inter-Changeable ball-bearing wheels turning with the blade give smooth-sailing support. Modernize old equipment — specify PADDOCK GUIDES on your new machines, Write today for circular and prices. SOLD ON 10 DAY FREE TRIAL.

PADDOCK TOOL COMPANY 1418 Walnut Street Kansas City 6, Mo.

Guide Makers Since 1920





WORK Entrumen

MORE

ACCOUNT OF STREET



Production of threaded products is more than just a formula of men plus machines. At Bland Precision Products Company it is an engineering technique. The application of mechanical ingenuity to every job enables Bland to handle operations requiring the most exacting specifications with ease and speed. Our engineering "know-how" provides the secret of getting multiple operations in long production runs without wasted time or motion and assures finer precision parts in greater volume — faster — at a lower cost to you. Write or wire your inquiries today!

Roll Threading
 Automatic Screw Machine Operations to One Inch Diameter
 Hardening
 Hardening
 Cut Threading
 Buffing and Plating
 Wide
 Variety of Secondary Operations such as Drilling, Tapping, Riveting, Milling and Knurling

Specialists in Rolled and Cut Threaded Production Parts



BLAND

Precision Products Company
HARTFORD, CONNECTICUT

BRANCH OFFICE: 861 PENOBSCOT BLDG., DETROIT, MICH.

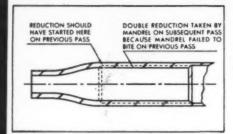


Fig. 8—To avoid this condition, maintain a sharp edged chamfer on front end of mandrel nib.

Greater efficiency is obtained from Carboloy mandrels by servicing at predetermined and regular intervals, rather than waiting until the mandrels "appear" to need servicing. Regular servicing gives better tubing; reduces operating costs: and results in longer over-all mandrel life.

After considerable use, it will be noticed that slight "rings" and wear marks (Fig. 6) will develop on the carbide nib of the mandrel at the point where tube reduction starts. If the mandrel is serviced as soon as these wear rings become visible, the rings can be removed by lapping and polishing.

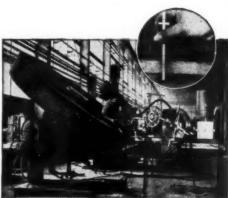
If prompt servicing is neglected, deep wear rings will eventually form in the nib. Such rings tend to remove all lu-

THE JOB: To weld the web plates to rim and hub on each side of a 12 foot turbine reduction gear . . . with speed, to meet the weld quality specified by the American Bureau of Shipping and the ASME.

THE PROBLEM: A peripheral weld must be made on very heavy plates in one pass with deep and complete penetration . . . with exact speed . . . exact heat control to minimize heat distortion and stress.

THE SOLUTION: C-F Power Operated Positioners with Variable Speed Table Rotation from 0 RPM and up were used to revolve the work under a Unionmelt Type UE-21 automatic welding machine.

THE RESULT: Fully automatic welding which produced a cleam, high quality fillet 1½ in. across the face (see inset) and 36 ft. in length in one pass. No machining or spatter removal was necessary.



If you need increased production, better downhand welding and lewer costs in your welding department, C-F Hand or Power Operated Positioners should be your first cheice. Write for Bulletin WP-22 and complete details. Cullen-Friestedt Co., 1321 S. Kilbourn Ave., Chicago 25, 111.

CULLEN-FRIESTEDT, CHICAGO 23. ILL



# ANNOUNCING An Entirely New Combination For sharpening carbipe tools



- ★ THE WHEEL is made by a new process, with the diamonds bonded by STEEL. Thus this wheel is practically indestructible; cannot be damaged by carelessness in off-hand tool grinding.
- ★ THE MACHINE has a 1 hp. spindle motor, providing ample power for full use of the steel-bonded diamond wheel. Special design of motor permits reversal of spindle as frequently as desired. A coolant pump is provided, with reservoir in base of machine. Table is quickly set at any angle from 5° above horizontal to 15° below. Wheel guard swivels to right or left; covers entire wheel except face in use. Machine is sturdy and compact; 16½″ wide x 26½″ deep over all. Net weight, with wheel, 134 lbs. (approx.). Available on immediate delivery, Descriptive bulletin on request.

Price
Grinding machine equipped with Wickman-Neven steel-bonded plain cup diamond wheel, 6' diam. x 1'/4" hole x %" rim . . . . \$395.00
Wickman-Neven replacement wheel . . . . . . . . . . . . \$157.00
Net to User

DEALERS: Some territories are still open in the U.S. We invite your inquiries.



A. C. WICKMAN (CANADA), LTD., P. O. BOX 9, STATION N, TORONTO, ONTARIO

bricant from the tubing. When this happens, the tubing will pick up and scratch. Eventually, small particles of the carbide will pull out, leading finally to complete breakdown of the tool.

A straight type mandrel which has worn undersize may be salvaged by resetting the mandrel further into the die. Before doing so, however, it is important that a recess be ground into the mandrel nib (Fig. 7) so as to avoid too great an area of contact with the tube.

When drawing steel tubing, a sharp edged chamfer should be maintained on the mandrel nib's front end. If this chamfer becomes rounded over, the mandrel will not immediately "bite" into the tubing as it should. If this happens, no reduction of tubing wall thickness occurs for some 6" to 8" during the first draw. This means that the mandrel must take a double reduction at the start of the next drawing opera-

tion (Fig. 8). The sudden jerk that occurs when point of normal reduction is reached tends to put excessive strain on the carbide mandrel.

In case of a double reduction, the tube end should be cut off beyond the area of double reduction and then repointed. A sharp chamfer may be maintained on the mandrel nib's front end by grinding it with a 100 grit diamond wheel, or by turning it with a diamond boring tool in a lathe.

These simple precautions will greatly increase the effectiveness of carbide mandrels in tube mills. Neglecting these factors may result in sacrificing a considerable portion of the better inside finish on tubing; closer tolerances on long runs; higher drawing speeds; increased footage per day; and the longer mandrel life, all of which are made possible by the correct use and servicing of carbide mandrels and dies.

### HYDRO-BORER CAN DO A BETTER BORING JOB FOR YOU



Model C-4F with special fixture for Industrial use. In operation shown, Hydro-Borer is boring and counter boring two holes at  $14^\circ$  angle in 14 ST Aluminum. Size of bore  $5.52^\circ$   $^+.0005$ , length  $3^\circ$ /4''. Special or universal work-holding devices are readily designed and built for mounting on the Hydro-Borer. Many operations possible on these versatile, accurate machines. Eccentric boring head, calibrated, permits advance in bore up to .014 without resetting tool. Bores from  $\frac{1}{2}$ '' to 5'' diameter by  $5\frac{1}{2}$ '' spindle travel. Other models for Automotive and Aircraft application.

Write us for engineering information on your boring problems.

### YDRO-BORER COMPANY A DIVISION OF SOUTHWESTERN DEVELOPMENT CO.

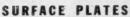
214 W. Orange Grove Ave. Burbank, California (Los Angeles County)

### DEPENDABLE MEASURING and CHECKING EQUIPMENT

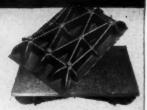


#### SLOTTED ANGLES

In 19 sizes, ranging from 4 x 9 x 5 and up-in both scraped and ground finish.



Over 50 sizes, ranging from 7 x 71/2 to 96 x 192.





### UNIVERSAL ANGLES

In 10 sizes, ranging from 4 x 33/4 x 5 and up—in ground finish. Special sizes made to order.



#### **BOX PARALLELS**

In 15 sizes, ranging from 3 x 4 x 12 and up-in ground finish.

Also, measuring angles, angle plates, vee blocks, straight edges, boring mill parallels, steel parallels, cylinder squares.

SEND FOR CATALOG

### Ready for Delivery STANDARD CAST IRON HAND KNOBS









STRAIGHT and OFFSET TYPE HAND WHEELS





MACHINE HANDLES





MALLEABLE IRON LEVERS

ROTARY SOUD



MACHINE PRODUCTS CORPORATION

6773 E. McNichols Road

Detroit 12, Mich.

# Welded Tubing CONTINUOUS PROCESS from strips through cut lengths. Size illustrated 1/2"-2" 0.0. 11 Gage

Write for complete information on this NEW ETNA TUBE ROLLING MILL THE ETNA MACHINE CO.

TOLEDO 10, OHIO



### COOPERATION IS THE LIFE OF FREE ENTERPRISE By ARTHUR ROBERTS

IVE us back our heritage", says free enterprise and the Fates echo the challenge-"What will you do with it when you get it back? Will you cooperate with others in your field thru the medium of your trade association to bring into being business practices that are best for consumers, competitors and your own organization?" This economic ideal can be approximated with best results thru the trade association; thru a pooling of interest that must be developed to a greater degree than in prewar years, if free enterprise is to survive; if postwar economic problems are to be solved with benefit to all; if full employment is to be more than fantasy.

In the past, too many association members ostensibly united for cooperative effort toward a common goal, have negated their objectives by dilatory tactics of one kind or another. At this time when free enterprise is at the crossroads, continuance of such practise is a fiddle for another Nero.

Free enterprise can best do its own policing to maintain full employment, to keep prices within reason. This is the democratic way. By keeping members well informed, by creating a high degree of business efficiency, the trade association can replace government controls with no cost to the taxpayer, without socialistic legislation — IF — members cooperate. There must be more than prompt payment of dues, more than passive acceptance of the by-laws. Each member must take his aggressive part so that he is well versed in all problems touching his field and not be content to pass the buck to as-

## "STAR DUST" LABORATORY GRADED PURE DIAMOND POWDERS

STAR DUST speeds up production enormously and produces finishes and superfinishes down to less than .0000004 of an inch.

Precision LAPPING POWDERS for PRECISION work

For GAUGES, TOOLS, DIES, etc., with tremendous TIME SAVING. These factors make STAR DUST Indispensable in lapping and superfinishing on HARDSTEELS, TUNGSTEN CARBIDE, CHROME.

Absolute control of particle sizes
 STAR DUST sizes as fine as .0001\*\*
 Complete absence of out-size particles
 Complete range of grit sizes

There is a STAR DUST Field Serviceman in your territory.



ONE SPRUCE STREET NEW YORK 7, N. Y.



sociation executives. Without the cooperation of all, the work is stymied. "In unity there is strength", is an adage of paramount importance today and this sentiment must be the foundation upon which all sound association activities are based.

Business will be brisk for a few years but the jitters will come to it again. At least, it is wise to be prepared, and then, unless free enterprise has solidified its position by unified action of the many business groups in our economy, so that it can bring back stability quickly, keep employment relatively high and WPA's out of the picture, bureaucracy, which now seems to be doing a fade-out, will crash the gate again.

From years of experience at conventions and in the field, I have found that some members of trade associations fall into certain zoological classifications and it is time to guit the monkey business or free enterprise may be in the

dog-house when business takes a catnap again:

1-The Wheel Horse-An association member who appreciates the value of teamwork and realizes that cooperative effort gets the load to the top of the hill. The Wheel Horse is always in harness working for association betterment and never needs the whip. At convention time, he does more than sing-"The old gray mare." He knows that pulling alone gets him nowhere but that brains and money pooling together make horse sense. Often he sacrifices his own interests and health, unselfishly tugging at the traces for the common good. Just unhitch the Wheel Horses and into the ditch goes the trade association.

2-The Flea-Jumps on the membership rolls one year, jumps off the next; a live hep-cat today, a dead canary tomorrow. Usually "joins up" after the association has pulled a master-stroke of some kind, or sometimes, sensing a



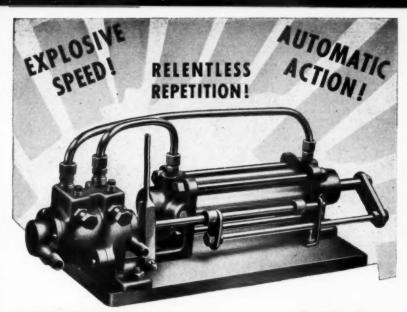
free loop of material is supplied to automatic feed, regardless of weight of coil. Littell Reels are made in 100-lb. to 20,000-lb. capac

ities. Automatic spindle and cradle types. Plain and motor-driven. Used in thousands of plants for faster production.

Other Littell products include Roll Feeds, Dial Feeds, Magazine Foods, Air Valves, Straighteners, Scrap Winders, Pres-Vac Safety Fooders, REQUEST BULLETINS. Mechanical Pickers, etc.

4153 Ravenswood Ave., Chicago 13, III.





### NOPAK Reciprotrol Valve

### Provides All Three — in Full Measure!

This radically new, 4-way, automatic reciprocating valve features Built-in Controls which provide the following advantages in operating any size or make of air or hydraulic cylinder, at 50 to 300 lb. line pressure:—

- Built-In Speed Control regulates stroke-speed in both directions, independently; allows choice of cycle speeds from 0 to 500 per minute . . . depending upon cylinder diameter and length.
- · Accurate Control of Stroke Length from fractional to full.
- Precise Location of Fractional Stroke anywhere within full stroke length.
- Fully-Automatic, Semi-Automatic or Manual operation.

Write, Today, for More Information on the Amazing Reciprotrol.

GALLAND-HENNING MFG. CO., 2754 S. 31st ST., MILWAUKEE 7, WIS.

NOW IN %" PIPE SIZE!

The 3/8" pipe size in which Reciprotrol is built makes it suitable for most oscillating applications.

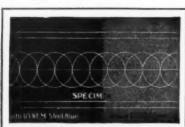


threatening development, such as too much encroachment on free enterprise from government sources, he jumps to association shelter for the duration, then discontinues membership when the storm blows over. If he is lucky to survive, he does his Flea act whenever propitious, and so on, ad infinitum. The Flea never discontinues his fire in-surance but business insurance, that can go up in smoke anytime. From contacts with the Flea, I find that usually the reason for his on-againoff-again proclivities is his desire to save money but his actions indicate to anyone conversant with business progress under free enterprise that he has the I. Q. of a walzing mouse and the viewpoint of a blind bat.

3—The Pouter Pigeon — Remember the spoiled child who picked up his marbles and went home when the game didn't suit him? He has grown up, gone into business and joined a trade association. But his mind still works the same as in his marble days. He is the same spoiled child. Toward all coopera-

tive efforts on the part of his broaderminded fellow members he displays petulance, criticizes, is defiant or apa-thetic. He shows his "independence" by refusing to attend meetings, withholding support when support is needed most, but quickly criticizes the busy bees working continuously to right wrongs and bring more milk and honey to all. The Pouter Pigeon forgets the constructive association work which benefits him every day in every way but regarding fancied slights or minor errors, even in the distant yesterday, his memory is elephantine. Altho he cashes in on the benefits of his association's efforts, he always complains, "We would have made greater strides if things had been handled by more competent men." Often the Pouter Pigeon becomes a Flea, then his excuse for jumping off the association band-wagon is, "I didn't like the fellows running it,"
"I find that I can get along as well without it", "It never did me any good anyhow."

4—The Sloth—Receives favors but never reciprocates. Joins an association



### DYKEM STEEL BLUE STOPS LOSSES making dies & templates

Simply brush on, right at the bench; ready for the layout in a few minutes. The dark blue background makes the scribed layout lines show up in sharp relief, and at the same time prevents metal glare. Increases efficiency and accuracy.

Write for full information.

### THE DYKEM COMPANY

(In Canada: 444 Pacific Ave., Toronto, Ont.)



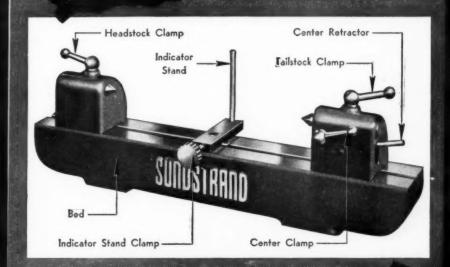


PRECISION
BUILT
FOR
PRECISION
CHECKING

### Check runout to within .0001" on this modern Sundstrand bench center

Here's modern checking equipment. You'll check work between centers easier, faster and within limits of 0.0001" on this improved Sundstrand bench center.

Center holes of headstock and tailstock are bored together for precision. Heavy ribbed base prevents deflection under clamping and assures a longer lifetime of accurate work. It's compact, portable... can be placed on bench or on a stand convenient to the work. Available in 6 sizes from 6" x 18" to 12" x 72".



### "ONE-HAND CONTROL"



### FREE ADDITIONAL DATA

Get complete specifications and additional features from this circular. Write for your copy today. Ask for bulletin No. 452.



MACHINE TOOL COMPANY

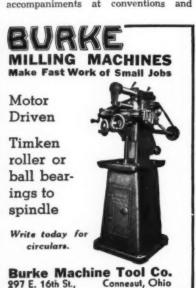
2535 Eleventh St. . Rockford, Ill., U. S. A.

only for what he thinks he can get out of it, not realizing that you get out of an association what you put into it— with interest. Direct benefits, such as savings effected or losses avoided in specific instances are easy to credit to sources, but it is hard to compute indirect benefits, which are the most important. Many association members have told me that affiliations made thru contacts with other members and their friends have helped them solve many problems in management to the benefit of profit. In this postwar period, these indirect results will prove of the utmost value in solving problems with which a management has never before been confronted. Thru association services, in meetings and at conventions, members capture that rara avis of business -new ideas and fresh viewpoints without which every businessman is ready for the taxidermist.

5-The Nightingale-Belongs to an association mainly to get a chance to warble, "Sweet Adeline" with the usual accompaniments at conventions and

local shindigs. Seldom asks for or digests advise from an association or the trade papers anent modern business methods or operating procedure. Such counsel, his for the asking, is out of his world. Being a good mixer, the Nightingale has been able to evade failure's trap at times without assistance from his association or the trade papers covering his field. But that was before Pearl Harbor. In this hectic postwar period, in order to deal with such problems as high taxation, reconversion to peacetime operation, the possibility of inflation or deflation, labor demands, etc., the Nightingale had better learn to play more modern jive.

6-The Chameleon - Attends meetings more to find out what others are doing than to offer cooperative services. Swears undying cooperation "for the good of our business" whenever the local boys get together to discuss their problems, but forgets all about it the next day and does as he pleases. The Chameleon is the first to slash prices indiscriminately whenever the green





Order today. Immediate delivery.

INDUSTRIAL PRODUCTS SUPPLIERS

106 Water St., Dept. H, New York 5, N.Y.

997 E. 16th St.,

### "Air Devices by Redmer"



Eliminates removing chuck from base of machine for changing index position. Index screw posts located on OUTSIDE of chuck. Provides positive alignment and depth control by using stationary type collets. Capacity 1/16" to 2".



### Air Foot Control and Valve

Designed to make its operation as tireless as possible. Opening and closing of plunger of valve on foot



No. FC-28

V-29

pedal is operated by a roller on pedal casting which relieves wear on plunger and facilitates operation. Valve is a brass casting which will take plenty of abuse and can be removed from the foot control and used as a separate unit in connection with cam operations.

### Redner Collet Air Chuck

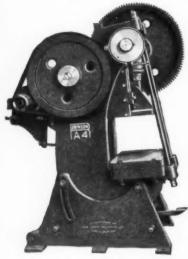
An air operated collet holding fixture using same type collets as Brown & Sharpe automatic screw machines. For drilling, milling, threading, etc., also for assembly work. Six models, No. 00, No. 10, No. 0, No. 2, No. 2 Special, No. 4, Collet Capacity 1/16"

Write for literature and prices



REDMER AIR DEVICES CORP.
608 W. WASHINGTON BLVD., CHICAGO 6, ILL.

### Long Recognized strength and service



 The new improved Series A Robinson Punch Presses retain all the sturdy characteristics of their predecessors with added safety, speed, strength and ease of operation and maintenance. Available in five sizes.

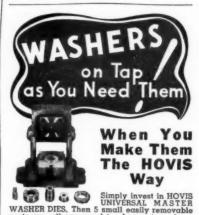
Send for descriptive Bulletin No. 7.

New Albany Machine Mfg. Co. New Albany, Indiana, U.S.A.



light appears and to do other things that undermine cooperation and destroy faith in the attainment of objectives without which no association can succeed.

Now, a word about the Ostrich. This bird is always howling about the difficulty experienced in solving some problem, from overhead control to postwar betterment, which the association or his trade paper has covered fully, yet, the Ostrich never "joins up" and seldom digests his trade paper even if he subscribes, but continues to hide his head in the sand under the false assumption that the Big, Bad Wolf of business inefficiency won't dig in after him. My investigations have shown that the Ostrich can usually afford it and is eligible to membership in a responsible association, his record is clean, yet, he never tries to get out of the jungle of bad business management via that dependable twin highway—the business association and the business paper. Why does he remain a dead pigeon? That's something I've never been Owlish enough to figure out.

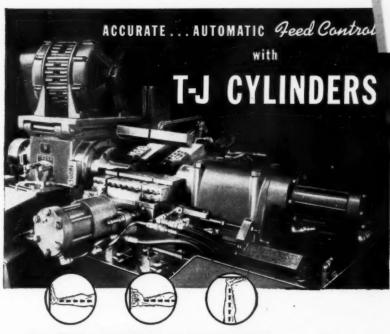


parts are all you need to change to make a Eliminate the cost of complete new dies. Make washers on short notice. Write for literature.

new size washer.

HOVIS SCREWLOCK COMPANY

8096 E. Nine-Mile Rd. Van Dyke, Mich. Suburb of Detroit



#### FOR POWER MOVEMENT IN ANY DIRECTION

T-J Cylinders on this Sparks Hydra-Feed Lathe furnish automatic and accurate control for feeding the work to cutters in this multiple tooling set-up.

Another tough job-and T-J Cylinders do it right!

More and more today in industries throughout the nation ... T-J Air and Hydraulic Cylinders are used to simplify operations and save time and labor. For pushing ... pulling ... lifting ... clamping ... 100 lbs. or 50,000 lbs. Available in many standard sizes and styles ... both cushioned and non-cushioned types. Backed by 29 years' experience ... T-J engineered to do the job better and cut costs! Write for latest catalogs. The Tomkins-Johnson Co., Jackson, Mich.





TOMKINS-JOHNSON





METAL TURNING-

THE UNI-MAT

(INDEPENDENT MOTOR DRIVEN TOOL SLIDE)

A NEW MACHINE-

THE UNI-MATIC

...and A NEW BOOK

WRITE FOR YOUR COPY

For chucking and fixture work—as small as 1" and as large as 16" diameter—the Uni-Matic combines sustained high-speed production with universal adaptability. Completely independent motor-driven tool slides (Uni-Mats) and preselected spindle speeds as high as 5000 RPM are tied into an electronically controlled cycle.

Get the full facts on these and many other features. Write for your copy of Bulletin 1701, our new 36page book on the Uni-Matic— Monarch's answer to rising production costs.

THE MONARCH MACHINE TOOL CO. . SIDNEY . OHIO

TURNING MACHINES

### A New Protective Plastic

A NEW method of processing a plastics material to afford a protective means for a host of industrial products has been announced by the General Electric plastics divisions. Pittsfield, Mass.

Possessing good electrical, physical and chemical properties, the material is tough, durable and resilient as well as water, acid and alkali resistant. It has good wet strength and will not split while it is being applied or during prolonged storage. The method of processing and its ease of application already has

made it suitable for a wide range of products and offers almost unlimited possibilities for many other fields.

Use of the material is twofold. It may be incorporated in the design of the product itself such as a covering for busbar insulation, as terminal ends or as electrical or mechanical seals for wires and tubing. At the present time it is more extensively used as a temporary protective during storage and shipment or during the fabricating and manufacturing processes of the finished



Caps and sleeves of a Vinyl plastic, made to shrink upon industrial products and serve as protective material.

product. Illustrative of the former is its use as coverings for cable ends, grips for pliers, wrenches and wire-cutters for insulating purposes. One of its best applications is to form a protective covering for threaded parts of various types of equipment.

The material is available in the form of caps and sleeves. Processing calls for a special dilator solution developed by G-E in which the material is immersed for a period of two to four hours. This expands the material as much as half



### A REAL HELPING HAND

It's a help that die makers, tool makers, machinery builders and general machinists have long sought— a more accurate and surprisingly faster way of transferring blind screw holes.



The Heimann Transfer Screw Set is a self-contained, complete tool. No wrenches or pliers are necessary. Made in  $\frac{1}{16}a^{\alpha}$  to 1" diameters. Send for price list.

HEIMANN MFG. CO.

332 Lincoln Ave.

Urbana, Ohio

again its normal size. While dilated, the unit is placed in position on the product and is allowed to dry. It soon shrinks to smaller than its original size and forms a tight fit around the product without losing any of its physical properties. It may be easily removed by cutting with a knife.

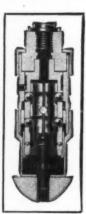
The protection which the plastics provide varies according to its application. In covering the ends of tubing used in the manufacture of refrigerator evaporators, the plastics cap prevents dust and moisture from entering the tubing during assembling operations. For threaded parts, the covering protects the threads from being damaged by contact with other materials. As a covering for drills and other tools, it may well be used to replace grease and prevent rust and corrosion as well as protect the tools from possible contact damage. On pliers and wirecutters, the covering is an excellent insulator.

The caps and sleeves are available at the present time in any desired



length and in diameters up to an inch. However, the fact that they are swollen to half again their original size plus the fact that they may be stretched considerably when in the swollen state permits diameters of two inches to be covered.

### HIGH SPEED STUD DRIVING the NEW WAY



### A FAST OPERATION TIMED IN SECONDS

The Titan Automatic Self-Opening Stud Driver is the only tool of its kind to incorporate an automatic take-up for wear on the jaws. As the threads in the jaw become worn, the action of the driving balls on the jaw drive shoulder tends to pull the jaws up in the taper nose bushing, causing them to close in on the stud. The illustration shows how the jaws are locked in full register, how the tool comes down and how the cycle reverses. Another feature is the inexpensive method by which the clutch can be renewed—by pressing the cam ring out of the main ring, reversing it, and pressing it back. This gives double wear at half the cost.

Affords accurate maintenance of projection heights, Can be used with any air or electric drill or drill press,

It is not necessary to stop rotation at any time, thus saving all the time formerly used in screwing on and off the stud.

WRITE FOR LITERATURE TODAY



### TITAN TOOL CO.

Production Tools

FAIRVIEW, PA.

### A hit!



It'S α bulls-eye..α hit right smack in the center.. and the answer to α demand which hundreds of plants, large and small, have been showering on us since before World War II.

Here is an outstanding example:

Conway Overhead Release Disc Clutch Series 550

Note what it does for you: can be set to transmit any torque from nothing to its rated capacity and will hold the setting even after adjustment has been made for wear. The clutch transmits the load until an obstruction or excessive torque is encountered. It then slips for a half-revolution and automatically disengages itself. When the cause is removed, the clutch is engaged again and production resumed. If desired, it can operate a limit switch.

Patented in U.S.A. and Canada

THE CONWAY CLUTCH CO.

1541 QUEEN CITY AVE.

### CONWAY CLUTCHES

FROM STANDARD BASIC PATTERNS FOR EXTRAORDINARY FUNCTIONING



CINCINNATI 14. OHIO



One of the important advantages of the product is its long life during storage. Whereas other coverings might be affected by the temperature and humidity when stored after a period of months, tests indicate that the material will last without splitting or cracking for years. Other advantages include the fact that the material is heat-resistant as far as conventional baking cycles are concerned and is resistant to plating and degreasing solutions.

The product is shipped dry and, according to engineers, there is no necessity for storing it in any particular way. They said it may be beneficial to preserve the caps and sleeves in sealed containers until they are placed in the dilator solution but actually they can be left in or out of the dilator indefinitely.

#### BOOKLET BY HERCULES

A new booklet listing Hercules chemicals and industrial explosives is now available from the Hercules Powder Co., Wilmington, Del. In a manner designed for easy reference, the products are indexed according to industrial use and also by chemical families.

The industrial uses described which are of greatest interest to the woodworking industry are those concerning adhesives, dies and pigments, lacquers, inks, paints and varnish, plastics, and packaging.







variety of miscellaneous profiles. Cutters of any given design can be provided. And since the accuracy of the generated form is controlled by the cutter, precision is not dependent upon involved adjustments. Write for literature.

THE FELLOWS GEAR SHAPER CO., Springfield, Vermont 616 Fisher Bldg., Detroit 2, or 1040 West Town Office Bldg., Chicago 12



### WHEN IS A MACHINE Washed Up"?

in seven years some say—but in modern production practice it is not a question of years or how much the machine has earned or still ower you. The question is, will your equipment enable you to compete with the new, faster working, more efficient and flexible layouts in your competitors plants.

A five-year-old Machine Tool is "washed up", for instance, if it can be replaced by one costing a few hundred dollars that will write itself aff in ess than a year through improved production. That's the story of Walker-Turner Machine Taols wherever metals, wood or plastics are drilled, out or shaped.

These machines are "light" only in weight and price. Their production output in the past eight years has astounded the management of thousands of plants—large and small—throughout the country.

A bey to high manufacturing efficiency and low manufacturing costs is the modern, flexible, light machine tool. It represents small capital investment, flexibility of operation, increased productivity and low operating costs.

Walker-Turner Machine Tools are sold only by authorized Industrial Machinery Distributors. A general catalog will be sent on request.



### **Widening Useful Boring Range**

By H. E. YORK\*

CURRENTLY, investigations are being conducted into the feasibility of expanding the fields for carbides by utilizing the comparatively high modulus of elasticity possessed by the carbide metals. Cemented carbides possess a modulus of elasticity ranging from about 73,000,000 psi; up (according to grade), as compared with steel's modulus of 30,000,000 psi.

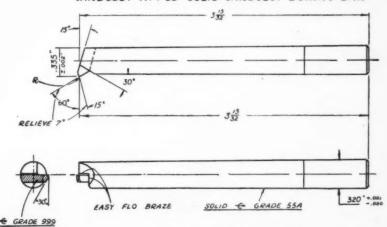
In recent tests, a number of boring bars were made up out of solid Carboloy cemented carbide to determine the extent to which advantage can be taken of the metal's stiffness in this type of application. It was reasoned that it should be possible to precision-bore deeper and smaller holes with boring bars made of solid carbide inasmuch as

the greater stiffness of the carbides could be used to keep the longer tool from backing away from the work or from "winding up" in the hole. Backing away of the boring tool is a frequent cause of eccentricity and taper in a bored hole. It was also believed that the higher torsional stiffness of the carbide boring bar might tend to improve the surface finish by minimizing wind-up and chatter.

Solid Carboloy cemented carbide boring bars were made up according to the specifications shown in the accompanying sketch. These were tipped with carbide cutting tips. Carboloy Grade

\*Development Engineer, Carboloy Co., Inc., Detroit, Mich.

#### CARBOLOY TIPPED SOLID CARBOLOY BORING BAR



This carbide tipped solid Carboloy precision boring bar was used to semi-finish and finish bore deep, small bore holes in cast iron valve guides. Ratio of length of bore to diameter was 7.3 to 1. The finished holes were round, straight, concentric, and held to a tolerance of .0002".

55-A was used for the boring bars. Tips were of Carboloy Grade 999 and were brazed to the bars with Easy-Flo.

The top of the tip was brazed to the Carboloy boring bar. This is not generally recommended as being good brazing practice inasmuch as when the tool is in use, the braze is placed more in tension than it is in compression. However, the cutting load on the job for which the boring tools were intended was extremely light. With the light loads experienced, the tips gave excellent service from this standpoint.

Cutting angles are shown in the accompanying sketch. The carbide tip has a nose radius. This was purposely held small to prevent chatter, yet it is larger than would be possible were the tip used on a steel boring bar. The nose radius tends to wipe out feed marks, thereby improving the surface finish of the bored hole.

The particular job for which the solid Carboloy cemented carbide boring bars were used was the semi-finish and finish boring of valve guides for automotive engines. The guides were of cast iron with a Brinell hardness of from 160 to 200 and with a bore of .345" diameter.

Ratio of length of bore to bore diameter was 7.3 to 1. Inasmuch as a ratio of 4 to 1 is generally considered maximum for precision boring with steel bars, it had been considered impossible to finish bore these valve guides in one setup. The method used was to chuck the guide and bore half way from one end, then re-chuck and bore from the other end. This method tended to leave a slight undercut about .0002" deep, in the middle of the bore. While this amount of undercut was not objectionable, boring from both ends meant double handling for one operation. After boring, the hole was "bearingized" to give the desired surface finish.

In using the solid carbide boring bars, it was planned to semi-finish bore on the "in pass" of the Carboloy tool; in-





### a ten-thousandth is routine...where JO-BLOCKS control by millionths!

It PAYS to control parts-dimensions to close limits. It pays in ease of assembly, in product performance and in the assured fit of replacement parts. In wartime, it paid richly in human lives saved. JO-BLOCKS, the pioneer precision controls, produced in America by Ford Motor Company only, for all industry, are warranted accurate to .000002", .000004" or .000008"±, and are available in sets at \$23 and upward, or in individual blocks, with various accessories. With properly selected genuine Jo-Block equipment, accuracy control can be maintained to the highest practical degree over any mechanical dimensional inspection.

#### FREE-NEW CATALOG!

Profusely illustrated, with full details, covering selection, application and care of Jo-Blocks. Write Ford Motor Co., Johansson Division, Dept. 38, Dearborn, Michigan.



dex tool into work a slight amount at end of bore; then finish bore on the "out pass." A precision boring machine to use the solid carbide boring bars in the manner described was not available in the manufacturer's plant at the time the tests were run. A small lathe in good condition was therefore used.

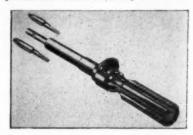
The valve guide was chucked and the boring tool was held in the tool post. Feed was set at .002" per revolution for making both semifinish and finish bore. This increased feed gave a finish which was equal to that obtained with the usual .0003" to .0005" feed used with conventional precision boring equipment. Thus, a considerable reduction in time was effected.

Holes bored in the valve guides with the solid Carboloy boring bars in this setup were straight, round, concentric, and to a tolerance of .0002.

As a result of this excellent performance, a precision boring machine designed to use carbide boring bars in the routine production of long, small bore valve guides is now being built.

#### TORQUE SCREW DRIVER

A long-needed hand tool is announced by the Apco Mossberg Co., 114 Lamb St., Attleboro, Mass. It is a torque screw driver for all hand-assembly jobs. Inch pounds are indicated directly on the dial



without the use of springs. The range is from zero to 25 inch pounds, adequate for at least 80% of all applications. This torque driver comes with two bits, one for Phillips screws and one for slotted screws, together with an adapter for a quarter-inch square socket to take wrenches for small nuts, studs and socket screws.

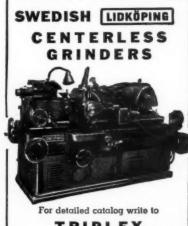
### \* THE \* WONDER CUTTER

The lowestpriced wire and rod cutter on the market. The hardened cutters last indefinitely.

Hand operated. A giant for work, cuts wire and rods up to %-in. round or %-in. square and band iron up to ½ in. by 2-in. Adjustable stop for repeated cuts to same length. Large or small, your shop can use a WONDER CUTTER.

Write today for prices.

THE FEDERAL FOUNDRY SUPPLY CO.
4602 East 71st St., Cleveland, Ohio



TRIPLEX
MACHINE TOOL CORP.

125 BARCLAY ST. NEW YORK 7, N. Y.

### From Flexible Shaft Headquarters

# WYCO

HUNUNCED"



### WYCO Innerliner

Makes core run more smoothly.

Transmits more power.

Prevents excessive wear.

Protects piano wire core from frictional contact.

Prevents core crystallization — prolonging life.

Insures cool and truer running shafts, free from vibration.

When you need a replacement shaft, see that it is a WYCO. Turn that extra motor into a flexible shaft machine with a WYCO — ½ HP Shaft 6 ft. long complete with coupling to fit your motor — \$28.25 — other sizes from ¼ to 2 HP. Remember WYCO Shafts include the greatest advance ever made in flexible shafting — the WYCO Patented Non-Metallic Innerliner (left). There are no kicks about shaft break-

shaft breakdowns when it's a WYCO. Send for catalog.

WYCO
FLEXIBLE SHAFT
EQUIPMENT and
PROFIT
PRODUCING
TOOLS

WYZENBEEK & STAFF, INC.

841 W. HUBBARD ST.

CHICAGO 22, ILL.

dex tool into work a slight amount at end of bore; then finish bore on the "out pass." A precision boring machine to use the solid carbide boring bars in the manner described was not available in the manufacturer's plant at the time the tests were run. A small lathe in good condition was therefore used.

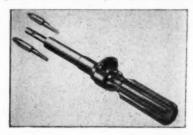
The valve guide was chucked and the boring tool was held in the tool post. Feed was set at .002" per revolution for making both semifinish and finish bore. This increased feed gave a finish which was equal to that obtained with the usual .0003" to .0005" feed used with conventional precision boring equipment. Thus, a considerable reduction in time was effected.

Holes bored in the valve guides with the solid Carboloy boring bars in this setup were straight, round, concentric, and to a tolerance of .0002.

As a result of this excellent performance, a precision boring machine designed to use carbide boring bars in the routine production of long, small bore valve guides is now being built.

#### TORQUE SCREW DRIVER

A long-needed hand tool is announced by the Apco Mossberg Co., 114 Lamb St., Attleboro, Mass. It is a torque screw driver for all hand-assembly jobs. Inch pounds are indicated directly on the dial



without the use of springs. The range is from zero to 25 inch pounds, adequate for at least 80% of all applications. This torque driver comes with two bits, one for Phillips screws and one for slotted screws, together with an adapter for a quarter-inch square socket to take wrenches for small nuts, studs and socket screws.



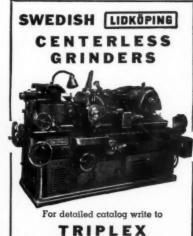
The lowestpriced wire and rod cutter on the market. The hardened ters last indefinitely.

Hand operated. A giant for work, cuts wire and rods up to %-in. round or 36-in, square and band iron up to 1/6 in. by 2-in. Adjustable stop for repeated cuts to same length. Large or small, your shop can use a WONDER CUTTER.

Write today for prices.

THE FEDERAL FOUNDRY SUPPLY CO.

4602 East 71st St., Cleveland, Ohio



MACHINE TOOL CORP.

### From Flexible Shaft Headquarters

# WYCO

"ARMORED"

# Alexible Shafts



### WYCO Innerliner

Makes core run more smoothly.

Transmits more power.

Prevents excessive wear.

Protects piano wire core from frictional contact.

Prevents core crystallization — prolonging life.

Insures cool and truer running shafts, free from vibration.

When you need a replacement shaft, see that it is a WYCO. Turn that extra motor into a flexible shaft machine with a WYCO — ½ HP Shaft 6 ft. long complete with coupling to fit your motor — \$28.25 — other sizes from ¼ to 2 HP. Remember WYCO Shafts include the greatest advance ever made in flexible shafting — the WYCO Patented Non-Metallic Innerliner (left). There are no kicks a bo ut shaft breakdowns when

FLEXIBLE SHAFT
EQUIPMENT and
PROFIT
PRODUCING

WYZENBEEK & STAFF, INC.

841 W. HUBBARD ST.

CHICAGO 22, ILL.

it's a WYCO.

Send for cat-

alog.

### Save Time

GRINDING IRREGULAR CONTOURS
on hardened DIES, PUNCHES, PARTS with

BOYAR-SCHULTZ
PROFILE
GRINDERS



#### NO. 1 BENCH MODEL

A fast operating, precision Machine Tool for saving time in grinding difficult contours, and irregular shapes and profiles. In production as well as in tool and die work, it performs quickly, much of the tedious work formerly requiring hours of hand time.

Spindle speed of 20,000 R.P.M. with vertical oscillation assures rapid stock removal, even with wheels of small diameter. Accommodates wheels 36" to 1" diameter.



#### NO. 2 DUAL SPINDLE FLOOR MODEL

A precision Machine Tool, designed for larger and heavier work, grinding contours and irregular shapes. This dual spindle model is really two machines in one. Spindles are independently powered and operate at 10,000 R.P.M. with vertical oscillations. Stock removal is rapid with wheels as small as 3½" diameter. Accommodates wheels 3½" to 3" diameter.

#### NO. 2 SINGLE SPINDLE FLOOR MODEL

Exactly the same as the Dual Spindle Model except without the upper spindle, which may be added at any time if desired. A favorite Machine Tool in Tool and Die Shops.

WRITE FOR LITERATURE

BOYAR-SCHULTZ CORPORATION

2108 WALNUT STREET

CHICAGO 12. ILLINOIS

236

# THE FOREMANSHIP FORUM By Edmund Mottershead

#### THE "REGISTERED PERSONNEL ADMINISTRATOR"

N the past few years, wherever personnel people have gathered together, the discussion has inevitably turned to the subject of professional standards in personnel work, and as a necessary corollary, of some method of recognition of these standards thruout industry. This has been the topic of informal and formal discussion for some time for the very good reason that such a step has been needed both by the personnel director who is doing a good job and by the top management which employs him ... as a means of safeguarding industry from the ministrations of the uninformed and poorly trained personnel executive.

This problem is a rather peculiar one as applied to the personnel and industrial relations field. In point of time, personnel management as we now understand the work is a relatively new line of human endeavor. It is an even newer part of top management as a distinct function. Broadly speaking, the

three functions of personnel management, procurement, management engineering, and labor relations or collective bargaining, have been carried out on a piece-meal basis in most organizations, with portions of all these activities scattered thru a dozen different departments and performed by different and usually untrained people.

Thus in a sense we have had "personnel people" in the industrial scene for a number of years; nevertheless it is largely true that the development of specialized techniques and a body of technical knowledge to handle the entire human side of industry is something that for the most part has come out of the recent war and the years immediately preceding the war and following enactment of the Wagner Act.

This is a part of the slowly dawning realization by top management that of the three factors of production, men,

### CHARLES K. DAVIES & SON PATENTS – TRADEMARKS

7240 WISCONSIN AVENUE WASHINGTON 14, D. C.



### For All Metal Cutting Jobs

STANDARD TOOLS OF ALL GRADES...General Purpose, Cast Alloy, and Tungsten Carbide. Three of a kind when it comes to quality, a Delloy tool, bit or tip will do the job better and faster. Delloy tools hold their edges longer, thereby increasing the number of pieces produced by cutting the down-time. Prove it today by sending for samples of the size and type of cutting tool you are now using. Our complete grinding department assures quick delivery on special tools. Standard tools stocked for immediate delivery.

# DOUDY METAL CORPORATION S CUTTING TOOLS

Affiliate of Ace Manufacturing Corporation 1209 East Erie Ave., Philadelphia 24, Pa.

Sales Representatives in all Principal Cities

materials, and machines, men alone cannot be expected to "stay bought" once they are "purchased" with or without a contract. The reason for this is obvious: man is not a logical but an emotional or psychological being. Individual and group reactions cannot be expected to remain constant from day to day, but will fluctuate as to moods, reacting to various stimuli from management and local conditions, both intentional and accidental.

The organization of the industrial worker to the point where he can make his demands felt, not only by management but by the entire nation has forever disposed of the concept that the worker is merely another tool of production, albeit a somewhat more complex and inefficient tool than most machines.

With the recognition of this state of affairs came the necessity for a corps of trained experts in human relations to apply the necessary stimuli to keep the workers in a productive frame of mind. As these men developed, during the past five or 10 years, new techniques were found in related fields which did more than just keep the workers in a relatively happy frame of mind.

Ways of measuring the capacities of the individuals to do particular jobs were developed for greater precision in hiring and placement; systems of bonuses and incentives were developed; job definitions and job evaluations became highly technical operations; morale-building developed into a highly skilled art; orientation of the new employe and training of the older worker became matters for careful analysis; grievance procedures, relationships with workers' families were studied and highly organized; and the actual art of negotiation in collective bargaining together with a sound knowledge of labor law and labor practices became an integral part of the equipment of the skilled personnel executive.

Industry has found that these activities "paid off" in terms of production

and costs. Most industrial organizations have come to the conclusion, not always promptly it is true, that it also pays to have a well organized and distinct personnel executive, rather than continuing to carry out these various functions as side-line activities of other members of the organization. The need for planned and co-ordinated personnel activity as well as trained personnel is apparent.

These factors, together with the complexity of government regulations on the subject of employer-employe relations necessitated the handling of the entire situation by an expert who possessed within himself a body of knowledge and fact peculiar to this field. The personnel department of a live industry became as complex and as carefully balanced as a fine watch. Any deviation from the true course is felt from plant washrooms to board-rooms.

Accompanying this development has been the fact that there has been as yet no royal road to fitness and accomplishment in personnel administration. The successful personnel directors have in the main had little or no formal scholastic training in the field, for until very recently no such training was available, and even now relatively few major schools and colleges offer degrees in personnel administration. In addition, most of the college courses offered even today deal with overall policy and "principle" rather than with the practical day-to-day problems which every personnel administrator must constantly solve. The entire activity is so new that our universities have so far been able to do little more than give mere lip service to the idea of training people for the work.

The men who had the know-how were busy using it while learning new ways and new techniques on the firing line. Only recently has there begun that interchange of experience and practice that must be the groundwork for any substantial body of scientific knowledge.



A recent survey of some 500 leading successful personnel directors bears out this story fairly well. The typical age is between 36 and 43. While many of them are college trained, there is little in their college background to fit them especially for this work. Most of them have a work experience prior to personnel work in fields ranging from sales to school teaching. The pressure on top management to find suitable manpower to handle this function has led to recruiting personnel men from almost all other walks of life.

While, as we have seen, there is a large body of highly specialized knowledge and skill required of the personnel director, on the other hand the thing looks relatively easy from the outside. Everyone likes to deal with his fellow human beings on some level, especially on that of "helping the other fellow" or solving his problems. The ex-salesman, torn from his job by materials shortages; the terminated army captain who successfully led a company of men in

the war; the ex-army classification clerk, and thousands of others attracted by the apparent prestige and financial rewards of personnel administration have evidenced their willingness to rush in where angels and most top managers fear to tread.

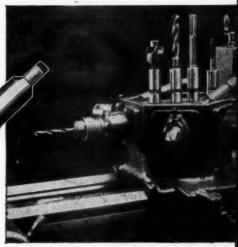
In some instances these inexperienced people have been successful in impressing management with their ability, and have been placed in authority, with dire results both to themselves and the businesses they were attempting to serve. Perhaps one of the saddest things in the business is to watch some bright young thing trying out an idea that was discarded years ago after bitter experience, to know it is foredoomed to failure and to be able to do nothing about the same sort of thing happening again and again. In addition, generally because of this sort of happening, for each such instance there is another top executive who has lost his faith in the value of all personnel work.



### ... need extra turret lathe stations?

Make them

MODERN-MAGIC CHUCK and COLLET EQUIPMENT



Modern Precision Tools
Include
STATIONARY SELF-OPENING
DIE NEADS
ROTARY SELF-OPENING
DIE NEADS
STATIONARY
COLLAPSINE TAYS
COLLAPSINE TAYS
MODERN MAGGE
CHUCKS AND
STATOPRING
STOSSTERS
INSERTED BLAD
I

Modern-Magic Quick Change Chuck and Collet Equipment has repeatedly proved its value to turret lathe operation where there are not enough openings in the turret to accommodate all the necessary tools for the job.

In effect, Modern-Magic Quick Change Chuck and Collet Equipment makes available as many extra turret stations as are needed. The tools being inserted and removed, one after the other, to take care of each extra operation.

With Modern-Magic Quick Change Chuck and Collet Equipment, tool changes are quickly and easily made. Production is stepped-up and cost reduced.

For complete information covering Modern-Magic
Quick Change Chuck and Collet Equipment, send
For Bulletin No. M-101

Prompt shipment from stock

### MODERN TOOL WORKS

CONSOLIDATED MACHINE TOOL CORPORATION
ROCHESTER 10, NEW YORK

This general feeling of a need for professional standards in personnel administration and a systematic method of recognizing professional proficiency recently crystallized into a plan for the registration of qualified personnel administrators and the development of a complete set of standards of knowledge and proficiency to govern the future issuance of certificates of registration based upon a scientific examination such as heretofore has been conducted for would-be attorneys and public accountants.

In response to the widespread demand and in recognition of this need of establishing an orderly procedure within the profession, the board of directors of the National Association of Personnel Directors went on record April 27, 1946, endorsing a program for setting professional standards in the Personnel Profession and for the registration of qualified personnel administrators to be governed by a Board of Examiners drawn from America's top-flight perdicals.

sonnel administrators. Registration is voluntary. Shortly thereafter the International Research Foundation for Personnel Administration was chartered by the State of Illinois for the sole purpose of setting standards in personnel work as well as examining and certifying those persons who measure up to these standards.

A committee was immediately constituted to invite the cooperation in this program of leading personnel directors and educators thruout the country. It has been agreed that personnel administrators now engaged in personnel work shall be certified without examination upon a showing of at least two years' successful experience in personnel direction. This action was taken on the ground that it is not the intention that the registration shall operate to hamper anyone in carrying on work he is already doing with success. Membership in the NAPD is not a qualifying factor . . . the program is for the benefit of the profession as a whole, and is

### Unskilled operators speed up WIRE STRIPPING

Yes, you cut costs immediately, get faster, better wire stripping when you put the Perfection Wire Stripper into operation. The most unskilled operator can remove insulation from the ends of solid, stranded or multiconductor cable and wire almost in stantly in any size up to half-inch in diameter. Send for complete details of this rugged, simple-to-operate machine

Distributors: Some territories are still open, offering substantial profit possibilities, Write regarding yours.



PERFECTION WIRE STRIPPER

### WEBER MACHINE CORP.

59 RUTTER ST.

ROCHESTER 6, N. Y.

# 5 reasons why you should use ragine machines



EASY OPERATION --- a single lever at the operator's fingerlips controls all operating functions.

2 OPEN FRONT — quick, easy leading, special fixtures readily placed.

CORRECT PRINCIPLE --- progressive feed throughout cutting stroke insures maximum death of cut.

EXTRA POWER — hydraulic system more than adequate to handle any over-

ECONOMICAL OPERATION the few moving parts are extra heavy and rugged, no failures here.

### FOR ALL YOUR METAL CUTTING WORK

Before you mill, drill, bore or grind a part made of metal, you must cut it off. Current, late model Racine Machines will "cut your cutting costs." All of them employ thin blades progressively applied. They are fast and accurate, save time and material.

Hydraulic feed and pressure provide a smooth, oilcushioned cutting action. The blade cuts deep, taking out long, thin, curled chips. Power requirements are low. True faces reduce subsequent machining operations and eliminate waste of stock. These modern machines are available in all capacities from 6" x 6" to 20" x 20". Automatic bar-feed models produce multiple pieces like an automatic screw machine.

Get all the facts on this equipment for your maintenance, tool room and production metal cutting. Racine engineers and field service men will cheerfully submit studied recommendations. Write today for the latest data. RACINE TOOL & MACHINE COM-PANY, 1754 State Street, Racine, Wis.



#### RACINE OIL HYDRAULIC PUMPS AND VALVES

For power movements in machines in your plant or in any of your products, investigate RACINE HYDRAULIC equipment. Variable Volume oil Hydraulic Pumps to 30 G.P.M. capacity. Pressures to 1000 p.s.i. Also a complete line of Hydraulic Valves in all sizes from \(^h\alpha^o\) to 1\(^h\alpha^o\). Ask for Catalog P-10-C.



RACINE

STANDARD FOR QUALITY AND PRECISION

entirely separate and apart from any association or organization.

The program, now in operation, contemplates four major steps: First, the rough determination of basic requirements for personnel administration and the invitation to registration of those personnel administrators successfully engaged in personnel direction for two or more years. Secondly, the development coincidental with this initial registration, of more exhaustive and specific standards of knowledge and proficiency to form the basis of examinations of entrants into the field and of those persons now engaged in personnel work who are at the present time unable to qualify for registration. The third step is the periodic holding of examination sessions by the Foundation in various key cities thruout the country.

The final element in the program is the periodic publication by the Foundation of the results of its research in the personnel field, as well as an annual list of those personnel directors who have been admitted to registration. These publications will at once serve to keep the alert personnel director abreast of the current body of knowledge in his field, and safeguard top industrial management as well as organized labor from the dangers inherent in employing individuals unskilled and untrained in personnel administration.

Shortly after the program was outlined in its entirety, and before any organized effort could be made to inform the profession as a whole of the details of the plan, word of mouth information had spread the news sufficiently that the Foundation's Chicago office was flooded with inquiries from key personnel executives thruout the country. At the time this is written, the number of applications for registration has passed the 600 mark, and interest in the program is growing week by week. The research program has already progressed to the point where significant





#### Send for This Handy Bulletin

It shows typical installations of ROCKFORD CLUTCHES and



POWER TAKE-OFFS. Contains diagrams of unique applications. Furnishes capacity tables, dimensions and com-



plete specifications.
Every production engineer will find help in this handy bulletin

\* Precision machining and grinding, proper hardening and the symmetrical contours of PULLMORE Multiple-Disc CLUTCHES insure perfect balance and smooth operation at both high and low speeds. Because of this close-tolerance construction and compact design the powerful pull of PULLMORE CLUTCHES is not affected either by centrifugal force or the direction of roatation.

ROCKFORD CLUTCH DIVISION WARNER

1309 Eighteenth Avenue, Rockford, Illinois, U.S. A.



FOR DRESSING large and coarse grinding wheels—where you want fastest possible cutting action—use Desmond Huntington dressers. Five types of handles and three sizes of cutters meet the full range of wheel dressing requirements. Bushings, spindles, washers and cutters are all carefully hardened. In every detail, these tools uphold Desmond's long-standing guarantee of complete satisfaction.

Desmond makes the only complete line of grinding wheel dressers and cutters available—eachitem designed for proper cutting action on its particular job—to give you maximum service from your grinding wheels. Write for complete catalog and the name of your nearest jobber.

THE DESMOND-STEPHAN MFG. COMPANY, URBANA, OHIO

# Desmond

the only complete line of grinding wheel

### DRESSERS & CUTTERS



BALL BEARING DRESSERS



REVOLVING CUTTER TYPE DRESSERS



DIAMOND HAND TOOLS



DRESSERS



SIMPLEX STEEL-SLIDE VISES

findings will be made available to top management and to the profession in a subsequent article in this magazine. Inquiries concerning standards and details of the registration program may be addressed to the International Research Foundation for Personnel Administration, Suite 1714, Number One North LaSalle St., Chicago 2.

### VAN NORMAN ACQUIRES MORSE TWIST DRILL

An announcement by James Y. Scott, Pres. of the Van Norman Co. of Springfield, Mass., states that Van Norman has purchased substantially all of the out-standing stock of the Morse Twist Drill and Machine Company of New Bedford, Massachusetts.

The Morse Twist Drill will be operated as a separate corporation, and will remain in New Bedford. Officers of the new management are announced as follows: James Y. Scott, Pres., James A. Wright, V.P., and Gen. Mgr., E. C. Adams, V.P. & Asst. Gen. Mgr., M. J. Rainey, Gen. S. M., L. H. Stanton, Treas.



A production tool, smooth in operation, engineered to fill a broad field where a fast bench unit can be used most advantageously. It saves time by taking the part to be machined to the grinder instead of taking the grinder to the part as in the case of a portable tool. It leaves the operator with both hands free with which to handle the work; the result, much more production. 3 stages of newer. of pewer.

Representatives in Principal Cities

# 130-134 E. LARNED ST. DETROIT 26, MICHIGAN



4114 N. KNOX AVE.

MEAD SPECIALTIES

DEPT. YA-96

COMPANY

CHICAGO 41, ILL





# TIPS of SOLID COLMONOY

These famous blades, that give you so much longer wear, are inexpensive. For example, a blade  $\frac{3}{4}$ " (A) by  $\frac{1}{2}$ " (B) and 10" long costs only \$2.55. You can apply the casting in 35 minutes, using  $\frac{1}{2}$ 00s. of silver solder. Or you can do as hundreds of others do — send your blades to us for complete service and prompt return.

### CUT CENTERLESS GRINDER COSTS WAY DOWN

- With Colmonoy tips you average upwards of ten times the life of hardened tool steel or cast iron blades.
- You have less breakage less down time than with other metals commonly used for tipping blades.

WRITE

Write for special Bulletin CG-7, giving full information, and low prices on all standard

WALL COLMONOY CORPORATION

7TH FLOOR FISHER BLDG., DETROIT 2. MICH

sizes.

# Pneumatic Tools Help to Speed Industry

NOT so many years ago, reference to pneumatic tools brought to mind first the riveting machines, or perhaps one of the tools widely applied in construction work but classified in the compressed air industry as a rock drill and not included in the category of pneumatic tools.

Today, the list of properly classified pneumatic tools powers many and varied applications, ranging from small light-weight air-operated drills to powerful industrial air motor hoists, capable of lifting up to 10 tons.

Industry in general, and particularly the plants confronted with a need for peak production of war products in the face of a critical manpower situation, have found it both economical and efficient to adopt air-operated tools in place of other less effective methods.

Outstanding among the reasons for choice of compressed air power rather than other forms of power is the convenient, light weight of air tools over other tools for the same operations. This has contributed much to war production thru the utilization of women workers and the subsequent release of men for heavier and more fatiguing work.

A small compressed air-operated drill weighs as little as 1¾ pounds as against possibly twice that weight for other types. In the aircraft industry this has been a great boon to production. Thousands of women operate these drills as easily as they would operate sewing machines.

Air-operated drills are of large sizes, too. Holes as large as 2½" are made by these heavier pneumatic tools. Operating wood boring bits, these large drills are capable of producing holes up to 4" in diameter.

Pneumatic drills are of two types:piston and rotary. The rotary type drills



Fig. 1—Small pneumatic drill finds almost continuous work around aircraft manufacturing and maintenance,

and some types of piston machines have governors to prevent racing of the drill points when running idle but deliver a full flow of power when under drilling resistance.

Fig. 1 shows a small air-operated drill being used by a woman war worker in an aircraft plant.

The accompanying table shows the general range of speeds provided for

		- TABLE I -		
Drilling Capacity, Inches	RPM	Spindle Thread	Morse Taper	Size Hose, Inches
3/16 3/4	2,500-3,000 2,000-2,500	3/6"-24 5/4"-16		1/2
3/6	1,200-1,400	.703"-16	******	3/4
1/2	800-900	5/8"-16 .703"-16 5/8"-16	No. 1 or No. 2	3/4
9/16	750-850	.703"-16	No. 1 or No. 2	3/2
9%	300-400	5/8"-16 .703"-16 5/4"-16	No. 1 or No. 2	3/2
29/32 1 11/4 11/2 2 3	300-350 400-600 350-450 275-400 200-500 200-500 50-100	.703**-16	No. 1 or No. 2 No. 2 No. 3 No. 3 No. 4 No. 4 No. 5	3/4 3/4 3/4 3/4 3/4
Wood Boring Tools				
1	750-1,000	Wood Bit Chuck	*****	3/2
2	400-750	Wood Bit Chuck	******	3/4
4	275-350	Wood Bit Chuck		3/4

various drilling capacities of rotary drills in steel.

Compressed air drills of larger sizes are used for all classes of drilling,

reaming, tapping, staybolt tapping, flue rolling and other applications. These drills are widely used in railroad shops, shipyards, machine



NOTE: Special spindles are available to permit use of drills 4''' to 36''' diameter with corresponding minimum centers of  $9_8'''$  and  $7_8'''$ .





This new, streamlined bench type grinder assures fast, quality finishing on metals, plastics, wood, fibre . . . at low cost. Built to machine tool specifications, Standard D-4 is equipped with improved band tension control and specially designed protective motor hood.  $4x36\frac{1}{4}$ " band. The ideal portable unit.

OTHER STYLES AND SIZES IN NEW MANUAL ON FINISHING-WRITE TODAY

WALLS SALES CORP. 306 E. 38th St., New York 16, N. Y.

# OILSTONES

NORTON ABRASIVES

# For FASTER Industrial Sharpening

Three distinctive qualities commend Norton Abrasives Oilstones for improved industrial sharpening; [1] factory oil-filling, (2) complete selection range of both natural and electric furnace abravises, (3) reputation for continued excellence sized in the "Pike" craft-tested tradition since 1823. Factory oil-filling retards glazing and speeds up cutting action. Complete section range insures greater choice from the coarsest vitrified stones to the surgical fineness of quarried Arkansas mineral. Reputation for excellence guarantees full-velue service.

For faster cutting industrial oilstones, Norton Abrasives offer four celebrated brands:

India—aluminum oxide—oil-filled Crystolon—silicon carbide—oil-filled

Arkansas—natural Novaculite—hard and soft Washita—natural Novaculite—open structure

Write for booklet, "How to Sharpen,"

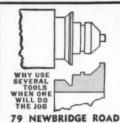




BEHR-MANNING - TROY, N.Y.

IDIVISION OF NORTON COMPANY

ALSO QUALITY COATED ABRASIVES SINCE 1872



# FORM GROUND CARBIDE AND HIGH SPEED TOOL BITS

TERRITORIES OPEN FOR LIVE REPRESENTATIVES

NEW MILFORD CARBIDE TOOL CO., INC.

NEW MILFORD, N. J.

Fig. 2—Close-corner drill on reaming operation in railroad shop.



shops, assembly plants, oil refineries, chemical plants, power stations and for construction work of all kinds.

Designs are readily available for difficult drilling operations. Fig. 2 shows a close-quarter compressed air drill in a reaming operation on a locomotive. Chipping hammers, another class of industrial tools operated on compressed air, are applied to various classes of chipping, scaling, beading and cleaning work on castings, dies, billets, etc. They are widely used in steel mills, machine

PLUNKET IMPROVED VISES

We make a complete line of modern vises

for drill presses, shapers, milling machines and grinders. Illustration shows our standard milling machine vise as regularly furnished and stocked.

In ordering this vise give size of slot in table:

No. 10—6" jaws, 1½" deep, opens 5", wt. 45 lbs. \$45.60 No. 20—10" jaws, 2¼" deep, opens 8½", wt. 120 lbs. \$62.40

Write for folder TODAY.

J. E. Plunket Machine Co., CHICAGO 12, ILL.





Fig. 3-Compressed air chipper scaling weld flux.

shops, foundries, assembly shops, locomotive and car repair and many other industries. Fig. 3 illustrates the use of an air-operated chipping hammer on weld-flux scaling. An accompanying table shows specifications for chipping hammers for various applications.

As previously mentioned, the riveting hammer is probably the best known





SPEED UP production in multiple operations with push-out type Hall Collet Chuck. Full spindle capacity or over. Tremendous grip over or under stock size to .007—without adjustments...no bearings, friction, heat or loss of power. Instant release without stopping lathe.

Two-inch capacity, now only \$145 One-inch capacity, \$95 Round, square or hex collets, plain - serrated

HALL MANUFACTURING COMPANY 622 Tularosa Drive • Los Angeles 26, Calif.

			- TABLE II -		*** * * * * * * * * * * * * * * * * * *
Piston Stroke Inches	Piston Diameter Inches	Length Inches	Weight Pounds	Hose Inches	Work Adapted For
136	5/6 3/4	8 10	3 51/2	3/2	Very light chipping Light chipping and scaling
1	136	113/4	. 10	3/2	Aluminum casting and light cast iron calking
2	13%	131/2	131/4	3/5	Heavy cast iron; light steel casting; flue beading
3	13%	141/2	141/2	3/5	Heavy steel casting; billet chipping
4	13%	153/4	151/4	3/2	Extra heavy chipping

of pneumatic tools since it plays a vital part in most steel construction, especially in steel bridges and steel buildings.

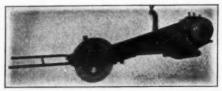
The riveting hammer, like the pneumatic drill, is for both light and heavy work. The lightweight machines cover

a wide range of light work in which soft iron, dural or aluminum rivets must be driven. These are especially well adapted to the aircraft industry and their use has been one of the potent factors in our large output of fighters and bombers. These smaller riveting



Fig. 4-Lightweight air operated riveting hammer on aircraft.

### MUMMERT-DIXON SWING FRAME GRINDERS

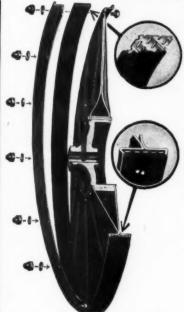


- Standard sizes for 24", 20", 16", 14" and 12" wheels.
  For high speed wheels at 9,000 to 10,000 sipm, or vitrified wheels at 5600 to 6000 sipm.
- V-Belt Driven Two speeds. · Convenient speed change.
- No balancing weights required.

Write for Bulletin No. 3

MUMMERT-DIXON CO., 122 Philadelphia St., Hanover,

# **MODERNIZE**



# Economically with CARTER BAND SAW EQUIPMENT

THE BIGGEST BUSINESS ever seen is in prospect for the manufacturer who is prepared to produce economically. With the cost of material and labor increased, modernization in production methods and machinery is the only way to reduce your costs.

Carter products will speed up, improve, will definitely MODERNIZE your band saw operations.

- Carter Rigid Band Saw Wheels
- Carter Quick-Change Tires
- Carter Micro-Precision Guides

### WRITE TODAY

for illustrated circular on how you can economically modernize your bandsaw machines with Carter band saw equipment.



# CARTER PRODUCTS COMPANY

960 Michigan Trust Building

**Grand Rapids 2, Michigan** 



Fig. 5—Air operated riveting hammer on railroad car rebuilding.

hammers are also extensively used in the fabrication of refrigeration and air conditioning equipment, small water craft, trucks, busses, metal furniture, stoves, electrical and radio equipment, and many other items where light rivets are driven. They can, of course, be adapted to such operations as chipping, scaling and calking when equipped with the proper chisels. In the small riveting hammer is found one of the outstanding contributions that compressed air has made to the war effort. Millions of rivets have been driven in aircraft, ships and ordnance by these pneumatic tools—faster, easier and more economically than by any other method. Thousands of women have operated these riveting hammers because they are lightweight

т	A	R	Т.	E	- 1	TT	т
-	23	D	-	200			

	VITRIFIED AND SILICATE BONDS			ORGANIC BONDS		
TYPE OF WHEEL	Soft fpm	Med. fpm	Hard fpm	Soft fpm	Med. fpm	Hard fpm
1-Straight wheels	5,500	6,000	6,000	6,500	8,000	9,500
Cup Wheels	4,500	5,000	5,500	6,000	7,500	9,000

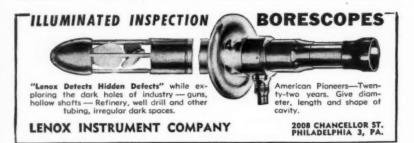




Fig. 6—Small air grinder with end tool for cleaning scale from aircraft assembly parts.

and easily managed. Fig. 4 illustrates the case and simplicity with which women war workers handle the airoperated riveter.

Pneumatic riveting hammers do the

heavy jobs, too.

For the larger sizes of riveting hammers, the applications enter into heavy construction and fabrication. Fig. 5 shows an air-operated riveting hammer driving button head rivets in a railroad hopper car. Repair and maintenance of the country's vast transportation system has been greatly benefitted by the flexibility of many air-operated tools.

While the riveting hammer is the most used pneumatic tool in many lines of structural assembly, the air-operated grinder has been growing in popularity

so fast that its many applications may one day exceed that of all other compressed air tools in industry. These air tools are made in even lighter weights than the small pneumatic drills. A grinder as small as 1½ pound weight is made for many applications, such as cleaning out small channeled steel parts, buffing and polishing. Other larger sizes are available.

Some of the applications of these machines include grinding iron and steel castings, smoothing off welds, grinding welding surfaces, removing surface cracks from billets, polishing and buffing automobile bodies, finishing dies, buffing bronze propellers, removing paint, rust and scale by wire brushing, sharpening tools and many other op-

### High Speed Cutting Tools

- Special high speed circular, dovetail, flat form and special tool bits.
- Design and manufacture of small machines, jigs, gages, dies and experimental parts calling for greatest accuracy.
- Regrinding and salvaging high speed flat form, special bits and small flat broaches.

WRITE FOR QUOTES
Representative Wanted

### Lincoln Park Manufacturing Co.

3302 Dix Road

Lincoln Park, Mich



### Producers of Screw Machine Products to Specifications

ONE, FOUR and SIX spindle automatics maximum capacity 25%" round. Hand Screw Machines and Universal Turret Lathes maximum capacity 3" round. Castings and Forgings machined maximum 10" diameter, 8" length, 15 pound weight. Secondary operation equipment for milling, drilling, tapping and assembling. Fabricators of aluminum, brass, steel and their alloys.

SCREW MACHINE SPECIALTY CO. 5600 Butler St., Pittsburgh 1, Pa.

erations. Industry would find it extremely difficult to adjust itself to operating without these particular compressed air tools.

Fig. 6 shows one of the smaller airoperated grinders cleaning small surface areas on aircraft parts, while Fig. 7 is a larger tool, grinding irregularities on a railroad frog.

The speeds provided by the makers of pneumatic grinders are based on American Engineering Standards Safety Code and are expressed in peripheral feet per minute.

Pneumatic hoists are especially efficient in foundries and assembly shops where exact "spotting" is required because they have inherent variable speed control. While there are cylinder hoists operating on compressed air, the most commonly used are motor-operated. These consist of a multiple-piston motor connected thru gearing to a drum in which a cable or chain is wound. They are equipped with safety stops and brakes which operate even if the air line is disconnected from the hoist. Capacities range from a 250-pound lift to a lift of 10 tons.

Important to the growing use of pneumatic tools in practically every type of industry has been the improved quality of these tools and the standard of maintenance and care which has been accepted by the compressed air industry. According to the Compressed Air Institute, many factors will con-



Fig. 7-Air grinder evening surface on railroad switch frog.

## Faster, Better Tapping at LOWER COST

### PROCUNIER TAPPING MACHINES

Practically eliminate tap breakage · Operate continuously at high speed · Cut rejections to an absolute minimum.

Low-cost Procunier Tapping Machines are the only machines with our compensating Springs for the automatic adjustment of tap driving pressure. Pre-Set independent of the operator, two long spiral springs exert the desired pressure on the tap, regardless of pressure on the foot pedal. Tap breakage is all but eliminated, tapping is speeded up and consistent accuracy is maintained. An automatic lubricating mechanism delivers the proper amount of lubricant to the tap at the precise moment, washing all the chips away.

Other features include the Procunier Hi-Speed Tapping Head with many exclusive advantages and the Tru-Grip Tap Holder. Send coupon today for circular with full details, specifications and prices.

### ACCURATE EXTERNAL THREADING WITH ACORN DIES



Do external threading jobs faster with a Procunier Tapping Head which holds standard Acorn Dies. Cut external threads quickly in brass, die castings and aluminum.

### PROCUNIER SAFETY CHUCK CO.

14 S. CLINTON ST. CHICAGO 3. ILL.

### AIL TODAY

PROCUNIER SAFETY CHUCK CO. 14 S. Clinton St., Chicago 3, Ill.

Please send me free bulletins on Procunier High Speed Tapping Heads

☐ Procunier Tru-Grip Tap Holders ☐ Universal Tapping Machines.

Name

Address ....

#### Accurate Hole Transfer Made Easy With NIELSEN TRANSFER SCREWS



Simply insert in holes, invert, strike sharply and you have centers and drill circles perfectly located. Reduce time and eliminate spoilage of other methods. 7 sizes U.S.S.-Inexpensivelast for years.

Write for Circular

DIE COMPANY 1962 W. Eleves Mile Read, Berkley, Mich.

tribute to a pneumatic tool's early failure; likewise a few sensible precautions will contribute to longer life as well as better performance.

Pneumatic tools are precision-made. All working parts have been ground to fractional thousandths of an inch and to obtain long life and high efficiency these tools should be kept clean, well lubricated and supplied with compressed air at between 80 to 100 pounds pressure at the tool with the tool operating.

Lack of proper lubrication is the chief cause of wear, according to the Compressed Air Institute. Each manufac-turer gives full instructions as to lubrication of his tools as well as comprehensive guidance for overall maintenance. In attaching a compressed air tool to the air line it is always advisable to make the connection from the top of the line, (see Fig. 8), so as to minimize the flow of moisture which may be present in the line.

Periodic attention should be given to condition of the air lines, and particular attention paid to leaks, which prove



quite costly over a long period of operation.

(Data and Photos Courtesy Compressed Air Institute)

#### MOLDALOY

Moldaloy, a new alloy with wide possibilities as a molding material is intro-duced by Trethaway Associates, 37 Wall St., New York City. Joseph D. Trethaway, head of the organization, was for many years with Cerro de Pasco Copper Corp., in charge of application and sale of lowtemperature-melting alloys.

Moldaloy is recommended for molds for casting low-temperature-fusing plastics; rubber molds; wax molds for precision casting process; models for engraving machines; master patterns; forming dies for thin sheet metals and thermal plastics; proof casting of molds, forging dies, etc; chuck jaws for holding irregular shaped pieces; protective coating on wood patterns and core boxes.

Moldaloy melts at 430°F., has a hardness of 22 Brinell, compression of 8,000 pounds psi, tensile strength of 11,500 pounds psi, shrinkage approximately .001" per inch.



Price \$6.50. Write for folder. J. R. Reich Manufacturing Co. 45 E. Stroop Rd., Dayton 9, Ohio



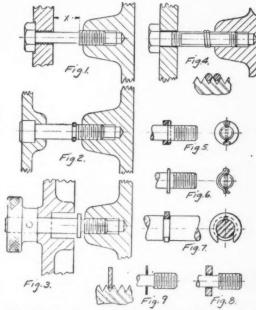
# Sou Talk Shop

### COVER SCREWS THAT WILL NOT FALL OUT

OVERS that are attached with screws are often misplaced or lost after removal. The accompanying sketches show methods of screw retention, means of overcoming the dilemma in which the shop man often finds himself. This is so especially where inexperienced help is employed. Regardless of the type of cover, be it made of sheet steel, cast iron, boiler plate or plastic, with some modification. these designs can be used effectively.

In Fig. 1, body of the screw between the head and the thread is relieved to a diameter just below the root of the thread. This may be done either before or after thread is cut. In fact, a batch of standard screws, threaded the

entire length, can be de-threaded to the proper dimensions to save making the shape from scratch. All that is necessary is to have dimension X in the drawing at least 1/16" longer than the length of thread engagement. Hole in the cover is also threaded. This of course is what retains the screw. When assembling, the screw is threaded



thru the cover until it falls loosely in place and in this position it is ready for use. Depending on the nature and accuracy of alignment, the surface contacting the underside of the head can be finished in cast iron by spot counterboring, facing, grinding or left rough. The use of a washer is immaterial at that point.



For a flush job a hollow or socket head cap screw can be used as is illustrated in Fig. 2. Here also a standard length screw can be used, it being only necessary to turn in a half round groove, just above the termination of the thread. Into this groove, after the screw has been inserted in the hole, is snapped a retaining ring. This makes a neat and inexpensive method of screw retention.

The more elaborate design shown in Fig. 3 is for use in a larger cover. In fact this method has been used to fasten a large hinged door taking place of the usual latch. It provides a positive means of locking the door. The stud is collared above the threads, the latter being relieved just under the collar. The hole in the cover is counterbored to receive the collar but is not always necessary. The knurled knot is pinned to the stud.

The design in Fig. 4 is a modification of that in Fig. 2, the exception being that no further machining is required on the screw or bolt. Here, two coils of a helical compression spring are screwed on to the proper location. The coils fit into the threads as shown in the enlarged view. If the spring is wound to a pitch a trifle shorter or longer than pitch of the thread, the coils will hug the sides of the threads more snugly. Another way is to wind the spring to such a smaller diameter, that it must be forced over the threads as it is screwed on. At best, the wire size comparatively small so the hole in the cover should not be greater than plus 1/64". In a %"-16 pitch screw, the wire diameter can be about 1/16" in which the wire protrudes 1/32" approximately over the crest of the threads.

In other simplified ways of accomplishing the same results, the cotter pin is used in several designs. This of course necessitates drilling a hole. In Fig. 5, a washer is mounted on the screw behind the cotter pin and acts much the same way as in Fig. 3. On small assemblies, the washer has been dispensed with, when the cotter pin is strong enough to resist any shearing action thru careless usage. When the cotter pin is used alone, the side of the

head showing the full head stops the pin from falling out. It should not be allowed to turn and can be controlled by wrapping the ends snugly around the shaft towards the head of the pin.

In Fig. 6, altho still requiring a drilled hole, the design is supposed to be more positive. The cotter pin is further separated so that only one leg goes thru the hole, the other being wrapped around the outside of the screw. This same result can be accomplished if a longer pin is used in Fig. 5 and both ends are wrapped back to practically touch the head.

A snap washer is used in Fig. 7. A groove must be turned in the screw body to accommodate the washer. The latter can be made in two ways, either a heat-treated type having sufficient spring to hold itself on or one not heat treated which is forced into contact with the grooved diameter by pinching with a pair of pliers. Usually the latter is sufficiently satisfactory if the washer is thin enough and the material has enough ductility to stay put.

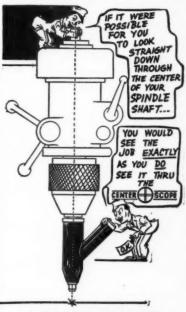
A combination of Figs. 1 and 5 has been used in which it is not necessary to tap out the hole in the cover. This is shown in Fig. 8. The screw is made as explained under Fig. 1. The washer is threaded and cannot come off once it is assembled, especially by accident. In this design the washer is tapped out so that at least two and sometimes three threads result in a given thickness. On small and delicate assemblies, the method shown in Fig. 9 is efficient and inconspicuous. The washer hole is slightly smaller than the outside diameter of the thread and can be assembled to the screw without being tapped out. The enlarged view shows how this is done. The metal of which the washer is made is thin enough to be screwed over the thread.

By H. F. WILLIAMS

#### SAFETY GUARD

An unusual type of safety device has been designed for use in connection with power presses. As can be seen in the illustration, the guard has been developed

# ONLY WITH THE Center Scope can you get . . . UNQUESTIONED ACCURACY



CENTER SCOPES ARE ACCURATE Plus or minus one ten thousandth.

CENTER SCOPES ARE FAST Line-up your layout in 30 seconds.

CENTER SCOPES ARE SIMPLE ANYONE can use them.

INSIST ON THE GENUINE CENTER SCOPE

Write for Catalogue No. 8

CENTER SCOPE PRODUCTS 3829 San Fernando Road Glendale 4, California

### MANY USES-BIG SAVINGS WITH

# LOW TEMPERATURE MELTING

CERROMATRIX-250° F. For securing punch and die parts: anchoring machine parts; short run forming dies,

CERROBEND-158° F. As a filler for bending thin-walled tubing-melts out in boiling water. Also used for automotive and aircraft assembly jigs, forming dies, etc.

CERROSAFE-165° F.-190° F. Used for proof-casting cavities in molds. forging dies, duplicate patterns, etc. CERROBASE-255° F. Used in electroforming dies, molds, etc.

CERROTRU-281° F. Metal molds for wax patterns used to make precision castings.

CERROLOW-117° F.-CERROLOW -136° F. and CERROLOW-174° F.

ANSONIA, CONN. L. Heres De Wyk & 89 Main St. BOSTON IS. MASS. Robert P. Waller Robert P. Waller
80 Boylston, St.
BROOKLYN 7, N. Y.
Belmont Smelting &
Refining Works
330 Belmont Ave.
CHICAGO 6, ILL.
Sterling Products Co., ine. 121 N. Jefferson St. CLEVELAND 14, O. CLEVELAND 14, 0. Die Supply Co. 5345 St. Clair Ave. DETROIT 17, MICH. Castaloy Metal Sales Co. Waterman Ave 197 S. Waterman Ave. HOUSTON I, TEXAS Metal Goods Corp. 16 Drennan St. KANSAS CITY 8, MO. Metal Goods Corp. 1701 Baltimore LOS ANGELES 21, LOS CALIF

CALIF. Composite Die Supply 1855 Industrial St.

REPRESENTATIVES & DISTRIBUTORS MILWAUKEE 3, WIS. Williams-Collins, Inc. 2409 State St., W. MINNEAPOLIS I, MINN. Northern Machinery & Supply Co. Lumber Exch. Bldg. Lumber Exch. Bldg.
MOLINE; ILL.
Sterling Products Co.
1524 Third St.
NEW ORLEANS, LA.
Metal Goods Corp.
413 Canal Bldg.
NEW YORK S. N. Y.
Belmont Smelting &
Refining Wks.
Cerro-Alloy Div.
Phil ADELPHIA 2 PHILADELPHIA 2. PA. Jackson Associates 152 N. 15th St. ST. LOUIS 15, MO. Metal Goods Corp. 5239 Brown Ave. TULSA 6, OKLA.
Metal Goods Corp.
19 E. Cameron
TORONTO 8, ONT.
The Canada Metal Co.
721 Eastern Ave.

CERRO DE PASCO COPPER CORPORATION 40 Wall St., New York 5, N. Y.



especially for both side and front fed blanking operations. It can be adjusted to afford the operator complete protection while permitting easy and safe accessi-

This guard is referred to as the swinging die closure, since the entire device may be swung away from the machine by a gate-like action. The guard is fully described in bulletin 102. It is manufactured by the Junkin Safety Appliance Co., 10th and Hill Sts., Louisville, Ky.

### PHOTOREPRODUCTION

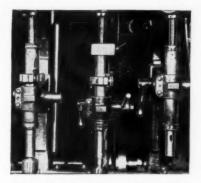
A new bibliography of articles and books on Industrial Photoreproduction may be obtained from the Industrial Photographic Sales Division, Eastman Kodak Co., 343 State St., Rochester 4, N. Y.

The bibliography includes sources of information photo-templates and on photolofting, photodials, nameplates, and instruction plates, and photogrid printing for stress analysis.

### SPRING CLIP OIL GUARD



Drill press spindles that are not equipped with safety guards or splash covers are often without lubrication because operators are prone to neglect oiling them. This neglect is chiefly due to



the fact that the oil splashes into the faces of the operators as they use the machines.

Fig. 1 shows an inexpensive spring clip oil guard that snaps on the drill press spindles. As the excess oil is thrown off the revolving spindle it hits the shield and drops. Fig. 2 shows the clip guard mounted on the center one of three spindles of a drill press.

> By E. KEARNEY, Westinghouse Electric Corp. East Springfield, Mass.

#### SHARPEN PIPE WRENCHES

The J. C. Moore Industries, P. O. Box 234, Fredonia, Pa., manufacturers of grinding machinery are marketing a machine for sharpening dull pipe wrenches. According to J. C. Moore, President of the Company, no similar machine has ever been patented.

Altho this machine can be used for a number of other purposes, it is especially designed to sharpen a tool, which up until now has been done—if at all—in a haphazard manner. In the past when a pipe wrench became dull it was figured cheaper to throw it away than to sharpen it. That, no longer need be done because the Moore Pipe Wrench Sharpener will sharpen them "good as new" at a very small cost.

### METAL CUTTING CHART

A metal cutting chart that combines in quick-reference form, complete information needed for cutting any metal by hand or power hacksaw and by metal cutting band saw is offered free on request by The L. S. Starrett Co., Athol, Mass.



- Designed to adjust for wear on all working parts...uses stock from ¼" to 3½" with large adjusting wheel,
- Uses standard flat type letters; adjustable for any size type...hardened rollers.
- Adjustable stop to locate part for production marking...no extras or additionals to buy...adaptable for air power.

NOTE: Some territories still open for agents and dealers.



3128 So. Main St., Los Angeles 7, Cal. Ask about HAND TAPPER, Too!

### BROACHES

Converted — Reconditioning — Sharpened
Prompt Service on Sharpening — Manufacturers of Broaches
Most Standard Keyway Broaches Carried in Stock

Reconditioning, Salvaging and Converting High Speed and Carbide Tipped Metal Cutting Tools

### CONANT TOOL & ENGINEERING CO.

351 West 107th Street

Commodore 0400

Chicago 28, III.

The chart which is double sided, gives on one side all essential information about hacksaw blades. When a slide is set to indicate the metal to be cut, the appropriate number of teeth per inch for hand blades and the correct pitch, speed and feed for power blades can be read instantly thru clearly marked windows.

Recommended tension readings for torque wrench and fixed tension devices are also provided.

The reverse side of the chart gives frequently needed information about band saw blades. Setting the slide gives the correct length and width of blade for any standard band saw machine and the recommended number of teeth per inch and the speed in feet per minute for any material.



### MATERIALS HANDLING BULLETIN

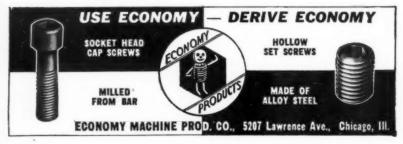
Designed especially for distribution to lumber and building supply dealers, a new two-color bulletin has been issued. Generously illustrated with photographs

Generously illustrated with photographs of Rapids-Standard conveyor equipment in actual use thruout the country, the bulletin treats on various pieces of equipment.

Specifications for all equipment illustrated are listed conveniently in the bulletin, enabling the interested prospect to make over-all plans for his particular installation needs.

installation needs.

Copies of the folder Form No. L-15 may be obtained by writing to the Rapids-Standard Co., Inc., Department LB-28, 308 Peoples National Bank Bldg., Grand Rapids 2, Mich.





# LUCIFFR

### LECTRIC REATING FURNACE

#### WITH AUTOMATIC HEAT CONTROL

Just what you have been waiting for. Electric heat treating furnaces that are easily operated; you can do your own heat treating — harden and temper dies, punches, gauges, jig and fixture parts, normalize weldings and castings. It's easy with a "LUCIFER" because it has the "LUCIFER" automatic electric heat control that permits stepless control of any predetermined heat control that permits stepless control of any predetermined heat within its range up to 2000° F. All "LUCIFER" furnaces are equipped with indicating built in pyrometers calibrated both in Fahrenheit and Centigrade, pilot light, control switches and automatic control devices. You can now equip your old Furnace with a Lucifer Automatic Heat Control unit 110 or 220 V. A.C. up to 5 K.W., from \$27.50 to \$41.50 complete, We can also supply a 7 day Control, which will turn your furnace on in the morning and off at nicht, shut off at noon Saturday, skip Sunday and repeat each 7 days. \$27.50 complete. All prices are F.O.B. factory Philadelphia, Pa.

### SPECIFICATIONS

- Interior size—Model 7051— 5½"x5½"x6"
- Exterior size—15"x15"x17" · Operation-110 V. A.C. only
- · Rating-1.2 K. W.
- · Ship, Wt .- Approx. 85 lbs. Operating cost-Approx. 3c

PRICE \$112.00 f.o.b. Factory. Philadelphia

# SPECIFICATIONS Interior size—Model 7053—8"x8"x10" Exterior size—18"x20"x24" Operation—110 V. A.C. or 220 V. A.C. Rating—3 K. W. Ship W. Approx 225 the

- Ship Wt.—Approx. 225 lbs.
  Operating cost—Approx. 6 to 8c per hr. PRICE \$188.00 f.o.b. Factory, Philadelphia

### SPECIFICATIONS Interior size—Model 7052—12"x12"x10" Exterior size—22"x22"x24"

- · Operation-220 V. A.C.

- Operation—220 V. A.C.

  Rating—4.8 K. W.

  Ship. Wt.—Approx, 350 lbs.

  Operating cost—Approx. 10 to 14c per hr.

  PRICE \$260.00, f.o.b. Factory, Philadelphia



#### DEALERS:

Write for our interesting offer to qualified distributors. Desirable territories open.



#### DISTRIBUTORS

New York-Connecticut-Northern Jersey Lafayette Tool & Supply Co. 128 Lafayette St., New York 13, N. Y.

Rhode Island-Massachusetts H. Leach Machinery Co., 387 Charles St., Providence 4, R. I. Reagan Company, 6409 Santa Fe Ave., Huntington Park, Calif.

Minnesota Satterlee Company 118 Washington St. North, Minneapolis 1, Minn.

Wilson Steel & Tool Co., Commercial Trust Bldg., Philadelphia 2, Pa.

SOLE SELLING AGENT . . .

GILBERT S. SIMONSKI 401 N. BROAD ST., PHILADELPHIA 8, PA.

### Precautions Insure Higher Accuracy

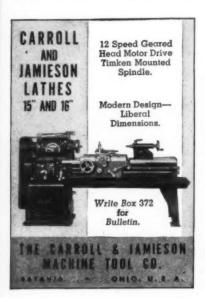
ENERALLY speaking. working within very close tolerances means close application to work and extreme care in measuring to insure only negligible variations in dimensions. In the plant of the Merz Engineering Co., at Indianapolis, Ind., however, a number of extra precautions are taken with the sole purpose of insuring greater accuracy in close tolerance work. These extra precautions are not taken just in the actual production of the dies, tools, jigs etc., but also are taken with the equipment used to produce them and even with the building itself which houses this engineering firm.

The first thing noticeable about this plant is that it is located between two sets of railroad tracks which under ordinary conditions would cause tremendous peaks of vibration, especially if trains happened to pass over both sets of tracks at the same time or at nearly

the same time. A method of leveling off these extreme peaks of vibration so that they are only 25% of what they normally would be has been worked out in this plant.

The larger pieces of equipment in the Merz plant are mounted on concrete slabs measuring three feet in thickness. These concrete slabs are set in holes in the floor sufficiently deep to take the slabs. The bottom of each hole is lined with a sheet of cork three inches thick, the slab resting on this cork lining. Around all four sides of the concrete slab is also a cork lining, this lining being two inches thick. Thus, the heavier pieces of machinery are mounted on concrete cradles which rest on cork and these have buffeting side linings of cork, also. It has been found that this method of mounting the heavier pieces of equipment reduces the vibration to 25% of what it normally would be and to a figure that isn't bothersome.

The same idea has been carried out with the entire Gage Department. This



# The A to Z of modern punch and diemaking



Send for 7 days'

examination copy

234 pages • 254 illus, \$5.00

You will find this new book excellent for apprentice training, valuable for reference. It explains in full detail each step in the design and construction of all types of dies and punches for fabricating sheet metal. Includes much new information, nor heretofore published, on methods and materials.

Write today for your copy of SIMPLIFIED PUNCH AND DIEMAKING by Walker and Taylor. You may return it within 7 days if not satisfied.

The Macmillan Co., 60 5th Ave., New York 11

Department occupies a space, 80 X 40 feet. The entire floor consists of a concrete slab three feet thick, as in the case of the individually mounted pieces of heavy equipment. Underneath this concrete slab is a three inch cork cushion two inches thick on all four sides. The surface of the concrete slab is topped with treated wood block to further kill vibration.

Next to the Gauge Department is the Inspection Laboratory. There is a space between these two with two doors equipped with automatic locks so that when one door is opened the other cannot be opened until that door is locked. This prevents both doors being opened at the same time. The reason for this is to maintain even temperature in the Gage room. The temperature in the Gage room is maintained at 68° with not half of one degree F variation, either plus or minus. Humidity is maintained at 55% with not over one percent, plus or minus variation allowed.

The floor of the Inspection Laboratory is like that of the Gauge Depart-

ment with the top surfacing of the concrete slab being cresoted wood blocks.

Extreme caution is taken at all times to maintain the fine pieces of equipment in optimum condition. For instance, on every machine in the Jig Borer Room, pieces of newspaper are laid on the beds of the machines to take up dust and dirt that might otherwise settle on the beds of the machines when they were being used. Nothing, not even micrometers are laid on the beds of the machines but rather are laid on the newspapers.

Instead of using steel to back up the clamps on these machines, wooden blocks are used. The wood gives and so does not make even a slight impression on the machine beds.

In this plant is a Jig Borer that has been in constant operation for over 16 years but has never had the table re-worked. In case there are instruments to be laid down during the course of operations at these jigs, the operator provides a piece of felt or cloth which

Universal

Stock

The Humm Universal Stock Reel is an essential device for the handling and feeding of coil stock to Power Presses.

Adjustable Reel to fit various sizes of coil.

Reel is adjustable to suit height of

Reel can be inclined to any position.

PRICE \$55.00 F. O. B. BROOKLYN, N. Y.

Manufactured By

John Humm Safety Equipment Co.

253 SHEFFIELD AVENUE

BROOKLYN 7, N. Y.



FIXTURES,

Cleveland 13, Ohio

1249 W. 4th St.

September, 1946

Inc.

### STANDARD PARTS:

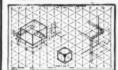


JIGS, FIXTURES DIES. GAGES. TOOLS

Featuring
Hand Knobs, Quarter Turn Screws,
Spherical Washers,
"C" Washers, Jig
Feet - Locating Keys Write for Catalog No. 2 Inquiries for Tool Die and Mold Estimates Invited.

GEORGE F. BUB AND SON

### ISOMETRIC SKETCHES ARE



EASY TO MAKE AND READ !

One trial will One trial wanter steady user of WADE'S ISOM-ETRIC blue lined paper. Shows all surfaces and in-

terior to scale. Makes clear blueprints. Saves time daily in hundreds of plants, Write for Circular. 1422 E. 109th St. Dept. H.

Wade Instrument Co.

he first places on the bed of the machine and on this he puts his tools, micrometer and so on. In this plant the operator is cautioned against touching the tables of the machines wherever possible in order to eliminate the possibility of even the slightest reaction on the table of acid content of perspiration from the operator's hands.

A Moore Jig Grinder is kept in a separate room, the door of which is so fitted that it seals the room. This is a precaution to keep dust out of the Jig Borer Department which immediately adjoins the little room where the grind-

er is located.

These extra precautions have been found to be decidedly worthwhile in maintaining working conditions favorable for work to extremely close tolerances.

By WILLIAM HENRY MORRISON

### WESTINGHOUSE METALS AND ALLOYS

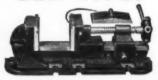
For engineers and designers in communications, electronics, and other fields.

a guide to the properties and applications of 18 recent metallurgical developments is presented in a new Westinghouse booklet.

Section 1 of the new 48-page illustrated booklet is a detailed discussion of the physical and electrical characteristics of Westinghouse magnetic metals and alloys, including Hipernik, Conpernik, Hiperco, Hipersil and Puron. In Section 2, which covers electrode, filament and contact metals, properties and applications of tungsten, molybdenum and Cupaloy are described. Two glass sealing alloys, Kovar "A" and Dumet, are outlined in Section 3 and Section 4 covers brazing and soldering alloys, including Phos-Copper, 35-alloy and tin-lead and pure tin sol-ders. Physical and mechanical properties of K-42-B, a high temperature alloy, are charted in Section 5 of the booklet.

A two-page table lists physical and electrical characteristics of these new metals and alloys compared with other commonly-used materials. Sketches, diagrams, curves and tables thruout the booklet present detailed data on the properties and applications of each material.

A copy of the new booklet (B-3369) may be obtained from Westinghouse Electric Corp., Box 868, Pittsburgh 30, Pa.



J. E. MARTIN MACHINE WORKS SPRINGFIELD, OHIO

### BURR KEYSEATERS



Mill keyways in the run or on the ends of shafting already erected \_ save money on alteration, erection, and repair work.

Made in 4 sizes, for hand or motor operation.

Write for Bulletins and prices.

JOHN T. BURR & SON 429 Kent Ave. Brooklyn, N. Y.

### NELCO Carboloy-Tipped 3 FLUTE END MILL

## did this job in 1/64 the 7ime

### Meu NELCO 3 FLUTE CARROLOY-TIPPED END MILL:



- · Plunges into solid metal and mills Will bore hole and mill in one operation.
- Eliminates Chatter -providing smoother cutting-a better job in astonishingly reduced time.



- · Mills so smoothly that a finished cut is either not required at all, or to a much lesser degree.
- · Stave sharp much longer-doesn't require resharpening as often.



· Provides Cooler and Freer Milling -More CHIP room decreases the chance of work overheating and twisting.

This tool is manufactured for use on all types of alloy steel, cast iron, brass and bronze. Sizes ranging from %" to 2" diameter.

Write for additional detailed literature.

### and did it Be

- One of the objective tests used by Nelco Engineers was the cutting of a "keyway". (Results illustrated below) End Mills compared were high-speed steel and Nelco's new Carboloytipped 3 FLUTE. Material was S.A.E. 1095 steel
- shorting. End Mills were ½" diameter: a 3 H.P. milling machine was used in both cases; 2400 R.P.M. and 14" per minute feed was used for
- the Carbolov: 609 R.P.M. and 3" per minute feed for the high-speed steel.

### OPERATIONAL RESULTS:

To complete the job using high-speed steel end mill.



### NOW COMPARE NELCO RESULT!

SY : NO STATE Job completed using Nelco's new Carbolov-tipped 3 Flute End Mills



NOTE: ABOVE TEST PHOTOS UNRETQUENE

For That EXTRA EDGE In Production 370 Hamilton Avenue, Dept. 3, Brooklyn 31, N. Y.

Any One Of These Well Known Distributors Will Be Glad To Help You

Albany-Sager-Spuck Supply Co., Inc. Baltimore-L. A. Benson Co., Inc. Bridgeport-Hawley Hardware Co. Brooklyn-A. N. Nelson, Inc. Cambridge-Robert E. Morris Co.) Cleveland-J. W. Mull, Jr.

Detroit-8-H Tool and Supply Co. Indianapolis-J. W. Mull, Jr. Newark-A. N. Nelson, Inc.

Div. General Carbides Co. Philadelphia-Carey-McFall Co. Pittsburgh-J. W. Mull, Jr.

### SAVE Hundreds of Valuable PRODUCTION HOURS By Giving The NELCO FIELD ENGINEER A Few Minutes Time!

For more complete details of this and other tests conducted by Nelco, write or see your local Nelco Field Engineer.

NELCO also manufactures a complete line of Carboloy-Tipped Milling Cutters, End Mills, and Twist Drills,

> Syracuse-A. V. Wiggins & Co. Toledo-J. W. Mull, Jr. Waterbury-White Supply Co. West Hartford-Robert E. Morris Co. York-L. A. Benson Co., Inc.

# WHAT'S NEW IN METALWORKING

### BROACHING 33 INTERNAL INVOLUTE SPLINES IN ONE PASS

THIRTY-THREE internal involute splines are finish broached in 8½" diameter steel clutch driving ring plates in a single pass on the Oilgear Type XP-30x54" Stroke Vertical Pull-Down Broaching Machine shown. The machine was designed and built by The Oilgear Co., Milwaukee 4, Wis., and the tool was made by Continental Tool Works Div., Ex-Cell-O Corp., Detroit, Mich.



In operation, a clutch plate is placed on machine table and the dual safety push-button depressed to start broaching cycle. As upper tool handling carriage



descends, tool shank accurately centralizes clutch plate and enters automatic puller on main pulling slide. Main slide pulls tool downward to broach clutch plate. Tool is secured on both ends during major part of broaching stroke. Operator removes broached plate and depresses dual safety push-buttons. Main slide and tool rise rapidly; tool enters upper holder and continues upward; main slide stops automatically at a preset point while upper carriage and tool continue upward to starting position.

Operator merely loads and unloads clutch plates, the 370 pound tool is handled automatically by the machine. Approximately .530" stock is removed on

# How many Wars have your lathes fought

Wars demand the utmost from machines, yet if yours is the average shop or plant, many of your lathes are "veterans" of two or more wracking periods of speed-up, round-the-clock war

production. On any logical basis, these tools are ready for replacement, for in battles, whether national or commercial, success goes to the one with the latest

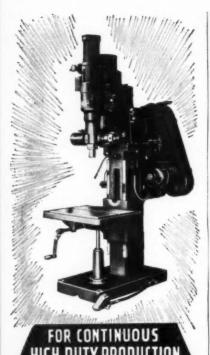
and most efficient equipment

In turning out small parts, for example, a modern S-56 SHELDON Precision Lathe will produce them easier, faster, more economically and with greater accuracy than any "battle scarred" 1898 or 1918 tool. These  $11^{1/4}$ " swing, 1" collet capacity, 56" bed, lathes complete with 4-speed V-belt motor drive, mounted on a modern, 5-drawer steel bench are so moderate in price, that you can have several for the cost of one large tool room lathe. Write tor Catalog.



### SHELDON MACHINE CO. Inc.

Manufacturers of Sheldon Precision Lathes Arbor Freezes Vises
Sheldon-Vernon Horizontal Milling Machines Vertical Milling Machines and Jp Borers Shapers
4742 N KNOX AVENUE - CHICAGO 41, ILLINO15, U.S.A.



Kaufman No. 10A Hi-Duty single spindle Lead Serow Tapper made in 3 HP and 1½" N.C.

threads in alloy steel.

This Hi-Duty Tapper offers these features: Fully enclosed . . . lead screw and nut operate constantly in oil bath . . . positively wear-proof clutches instantly engaged and controlled by air cylinder . . quick traverse when not actually cutting threads . . accurate depth control . . control to protect tap overload, and further protected against Jamining if work is placed in upside down . . class 3 fits always assured and perfectly controllable. Complete information upon request.

KAUFMAN MFG.CO.

the inside diameter at a production of 120 plates per hour.

A small slab tool mounted on main slide finish broaches external mounting surfaces on 200 lever brackets per hour.

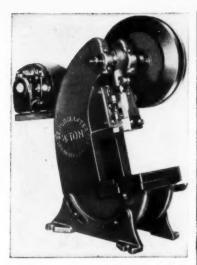
This broaching machine is equipped with a dual safety push-button control and a finger-tip switch for selecting manual or semi-cycle operation for internal broaching or semi-automatic operation for surface broaching. An Oilgear Type DX-3511 Two-Way Variable Delivery Pump efficiently transmits fluid power to tool pulling slide. Cutting speed is variable up to 30 feet per minute. Return speed is independently variable up to 80 feet per minute. A regenerative, stabiliz-ing oil circuit to main slide provides high return speed and saves power. Table top is removable. The wide tool pulling slide and removable puller bracket is adjustable to accommodate tools of different lengths. Automatic pressure lubrication provides a new film of oil on hardened and ground ways and other vital points each semi-cycle of machine. All tool handling carriage and tool pulling slide movements are fully interlocked and syn-chronized. Both stroke and position of tool slide can be adjusted to suit broaching operation. Broaching and return forces are indicated in the direct reading pressure gauge.

### COMPACT BENCHMASTER PRESS

A new, improved model of an unusually compact four-ton Benchmaster punch press designed to approximate the performance of far larger presses is now being produced.

Weighing only 215 lbs, this unusual press operates at a speed of 285 rpm with a 1725 rpm electric motor. Its many unique features include a precision-ground shaft that is keyed by means of a press fit to a large eccentric, thereby offering a shock-absorbing bearing surface with no weak or thin points to shear or fail. An over-size bronze bushing encloses the eccentric, and full diameter bronze bushings encase the shaft at wear points. The frames are cast in one piece from semi-steel, heat-treated, heavily reinforced at stress points, and are mounted on two supports forming a broad stand cradle which allows the machine to be inclined for greater versatility in operation.

A further feature is an open back that makes it possible for work to be inserted from front as well as from sides. A new type floating motor mount which maintains proper tension of the V-belt drive assures maximum power delivery at all times.



When ram is in up-position, a 5%4" die space is available. The 6" x 8" bolster plate has a thickness of one-inch and a two-inch hole in its center. Fly wheel has a weight of approximately 50 lbs.

The manufacturer points out that altho it was specifically designed as a punch press, this versatile machine is equally well adapted to do stamping, marking, punching, crimping, riveting and other high-speed production operations. Complete information may be obtained from Benchmaster Mfg. Co., 2952 West Pico Blvd., Los Angeles 6, Cal.

#### BORES LARGE CYLINDERS

A new vertical boring machine for precision rough and finish boring of large cylinders up to 40" in length and 6" to 8" in diameter is announced by Giern & Anholtt Tool Co., 1306 Mt. Elliott Ave., Detroit 7, Mich.

The machine, identified as their TR model, offers extreme rigidity and accuracy with the spindle piloted directly above the work in a Gatco sealed rotary bushing. It is equipped to bore cast iron, steel or non ferrous tubes using multiple blade boring cutter.

R. G. Kilzer, General Manager, says that particular interest in the new design has been shown by manufacturers of hydraulic cylinders, many of whom have Accurate Spacing-by the Mandaths Thousand The John Son Son Service Ser

### DE-STA-CO ARBOR SPACERS

Save time in setting up milling machine cutters, and wherever accurate spacing must be obtained and maintained.

Made of metal. Not only for greater accuracy, but also because they will not be affected by heat or oil. And can be used over and over. Standard sizes from .001" to .125". Specials, cut from bar stock, in any length and ground to decimal.

Order a set of De-Sta-Co Spacers from your Mill Supply Distributor today.

DETROIT STAMPING CO.



### Do You Know . . .

## Janette Builds BOTH Motorized and Motorless Speed Reducers.

32 styles and types of motorized and 20 motorless machines are available with foot or flange bases. ¶ Janette built motors are designed specially for driving Speed Reducers. ¶ Various types of motor enclosures, modifications, voltages, phases and speeds can be furnished. ¶ All Motors and Reducers are Built to ONE Standard of Quality.





been doing such work on slower equipment, encountering run-out, curvature and other irregular conditions.

The model TR is completely hydraulically operated and has a feed on 8" I.D. tubing of 4" per minute in roughing and 4½" to 5" in finishing. The power requirement on the operation being approximately 10 hp. Adequate coolant provisions are incorporated with the direct flow of the coolant over the cutter for the entire depth of the cut. Fixture is of the self equalizing type.

#### IMPACT TESTING

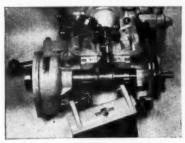
The Baldwin Locomotive Works, Philadelphia 42, Pa., has issued a new bulletin giving the specifications for its improved Sonntag Universal Impact Testing Machine for metals. The machine, which is easily converted from testing specimens to structural parts, now has six possible ranges:—25 and 60 ft lb., 50 and 120 ft lb. and 100 and 240 ft lb. A unique design of striking edge permits a quick adjustment for Izod, Charpy or tension testing. Simple accessories are available for testing die-cast specimens. Accuracy is guaranteed to be well within ASTM specifications.

### SPECIAL LATHE ATTACHMENT

'fhe "Dunamatic" made by the Dunn Engineering Company of 6341 Lyndon Avenue, Detroit 21, Michigan, is designed for attachment to either the Atlas or Logan lathe, and its use with either one provides an entirely new means of producing small parts automatically, and with good accuracy, at very low cost.

It is claimed by the manufacturer that a good many small parts, particularly those that require only form and cutoff operations, now being produced on the large and expensive automatics, can be produced just as rapidly, and with equal precision, on the "Dunamatic."

This attachment employs the use of face cams to control the operation of rocker arms which, in turn, control the operation of form and/or cut-off tools attached to them. Either circular or flat form tools or a combination of both may be used, the selection of type depending upon size of the production run. The rocker arms operate on pivots instead of slides (which, of course, are flat sur-faced) thus eliminating the necessity for constant adjustment. A means of adjustment is provided, however, when long usage might make simple adjustments necessary. Since all the pivot parts are precision ground and properly hardened, need for adjustment is seldom necessary,



The stock is cam fed thru a tube by feed fingers, into a collet, automatically. and a moving stock stop determines the length of the part to be formed and/or cut off. Closing of the collet, which is also an automatic operation, is timed to co-incide with the start of operation of the work tools.

BELT GRINDER ATTACHMENT
The Porter-Cable Machine Co., 300-7
Exchange St., Syracuse 8, N. Y., an-



Rouse **Fixture Set-Ups** that Speed Pro-

duction.





It's easy to make light cuts-fast and accurately-on aluminum, brass, steel and other metals . . . This high-speed, motor-driven unit is ideal for second operations on plastics. Anyone can quickly learn to run it, Rouse Fixture Set-Ups increase productive capacity for a large variety of small parts for electrical work, instruments, aviation components, etc.

Available for immediate shipment. Write for illustrated circular and full details.

B. ROUSE AND COMPANY 2216 N. Wayne Ave. Chicago 14, III.



A new type of safety clutch which releases completely and instantly when overloaded. Positive in action – accurately adjustable – they furnish absolute protection. Their rugged construction – simple design with few parts – means long trouble-free life.



Areliable series of spring-loaded slip clutches and couplings made in a variety of types. Outstanding for-reeling and winding operations-tension drag brakes—limited torque-preventing overloads and shocks-starting heavy loads-and many other uses.



WRITE TO DAY!

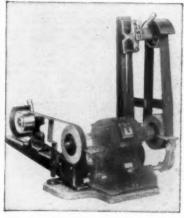
for the new series of 6 illustrated Bulletins furnished FREE upon request. Featuring our complete line of Industrial Clutches and Couplings-Over-Running-Single Revolution-Friction-Centrifugal-Overload Release-Slip.

THE HILLIARD CORPORATION
126 W 4th 5t ELMIRA N Y
Manufacturers of
INDUSTRIAL CLUTCHES

nounces an addition to its line of abrasive belt grinders,

A light, narrow belt grinder attachment, type N-2, has been developed, capable of performing all kinds of light burring and grinding operations. Combining, the versatility of platen grinding with the economy and speed of contact grinding, it is useful for light grinding of flats, arcs, angles, gear burring, weld grinding, cleaning-up operations, etc. A wide variety of composition and plastic materials, as well as steel, iron, aluminum, wood and glass are easily ground and surfaced.

This light and versatile attachment is especially useful in tool rooms, sheet metal shops, pattern shops, electrical shops, assembly, repair and maintenance departments or wherever light grinding and finishing operations are required.



The attachment is furnished without motor and is quickly aligned and attached to the familiar bench type wheel grinder, to which a resilient contact roll has been fitted.

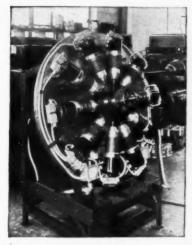
The complete unit assembly stands 27" high with a width of 2½". A 6"x7" Tshape base is drilled with 3 holes for convenient mounting to bench or work table. Platen size for flat grinding is 2" x 4". Resilient contact rolls 2" x 6" or 1" x 6" can be furnished. Using an endless abrasive belt 2" x 48" the attachment can be used either in the vertical, horizontal or any position (angle) between the 90 degrees. The makers emphasize that ab-

rasive belt grinding assures faster cutting as well as cool and vibrationless operation. Belt changing is accomplished in a matter of seconds eliminating expensive and time-consuming wheel dressing.

#### SIMPLEX RADIAL UNIT

The Simplex Tool Engineering Co., 2540
Park Ave., Detroit 1, Mich. has developed
a special high production drilling machine for drilling 20 holes in automatic
transmission bands and linings in one
operation. The bands and lining are
clamped manually in the work holding
fixture. The operator then pushes the
starting button and the fixture, which is
positioned by air cylinders, moves to position No. 1 and the Drill Units, which
have automatic forward and reverse
movement of the drill spindle, drill 10
holes. The work holding fixture then
moves to position No. 2 and 10 more holes
are drilled and the work holding fixture
then moves to its original position and
the part is removed.

All movements are fully automatic and electrical interlocking controls provide foolproof and safety features. The starting button is conveniently located at front of machine and also includes a master stop button. All elements of the control



system are fully enclosed and operated on a 110 volt pivot circuit.

The machine is shown with the protec-





tive cover removed. In the final assembly the protective cover forms a housing for

all moving parts.

Literature is available on the drill units
which are made in progressive sizes with
drill capacities ranging from No. 54 to
34" diameter.

### CHECKING INCLINED SURFACES

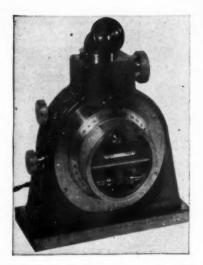
Engis Equipment Co., 431 South Dearborn St., Chicago 5, Ill., is featuring a new type of super precision Clinometer called the Microptic Precision Clinometer which optically checks angles over the full 360° circle, to graduations of .05 minutes of arc.

It consists of a light alloy body containing an accurately divided glass circle

It consists of a light alloy body containing an accurately divided glass circle and an optical reading system. The under-side of this Precision Clinometer is a hard steel base with lapped surface. This instrument makes it possible to quickly check to the accuracy of a good sine bar without using gage blocks or other

auxiliary tools.

Another instrument featured by Engis is the Clinometer Model "C" now being introduced for the aircraft field. This instrument quickly and independently checks pitches of propellers and plane



surfaces on fuselages, wings and other locations to one minute accuracy.

### YOST DRILL PRESS VISE



This new Yost vise has been designed expressly for use on drill press operations. Does away with special and costly jig fixtures.

Offered in two sizes.

Vise No.	Width of	Opens	Weight
	Jaw, Inches	Inches	Pounds
1D 2D	31/2	31/2 51/2	121/2

Do you need a vise of ANY type?

Write today for bulletins on the extensive Yost line

YOST MFG. COMPANY
1335 SO. MAIN ST.
MEADVILLE, PENNSYLVANIA

SEND US YOUR PRINTS FOR Quetations

### THREAD GRINDING

Also Internal, External and surface grinding.

BROACHING SCREW MACHINE PRODUCTS MAGNETIC INSPECTION

GEARS

SPUR REVEL WORM



Model "C" is gravity operated, does not require surface plates, protractors or any accessory equipment, and readings can be made off the work when required. The straight edge is removable and templates to fit the work can be substituted in its place.



Other model Clinometers with different base arrangements are available for general purpose angular inspection.

#### STEEL WHEELS AVAILABLE NOW

American Brazing Co., Los Angeles 14, Cal., is now manufacturing rubber-tired steel wheels in, 6" and 8" diameters for immediate delivery. Other sizes are in



process and will be available soon. Two pressed steel discs permanently joined by a special copper brazing method makes the wheel rugged to support loads up to 500 pounds. Tires are vulcanized directly on the wheel, which has a "V" groove center line in the rim to assure permanent alignment.

The ¼" wall hub is built with a centered hole for lubricating the axle. Lubrication is obtained by the "floating ball" method, which consists of placing a steel ball in the oil reservoir before brazing. The ball action in the lubricant provides automatic lubrication and in addition rattles when the reservoir is dry.

# MODERN.. MOTOR DRIVE

Prompt Shipment



Save floor space, save power, and eliminate line shaft expense by installing MODERN MOTOR DRIVES in your plant. All drives are ball-bearing equipped and designed to fit practicall; every machine tool. Soundly engineered for long life.

MODERN MOTOR DRIVES DIV.
NICHOLS ENGINEERING CO.
2400 W. MADISON ST., CHICAGO 12, ILL.

# GUN DRILLS

FOR DEEP-HOLE DRILLING WITH H. S. S. OR CARBOLOY TIPS. INQUIRIES SHOULD STATE DIAMETER, OVER-ALL LENGTH, SIZE AND STYLE OF ADAPTOR.

# CONNER TOOL & CUTTER COMPANY

5555 Conner Ave., Detroit 13, Mich.

#### Leblond Redesigns 13" Production Lathe

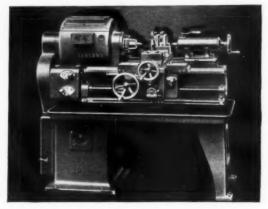
The R. K. LeBlond Machine Tool Co., Cincin-nati 8, Ohio, has recently redesigned and is now in production on its new 13" Motor Head Rapid Production Lathe.

An outstanding feature of this new lathe, which is designed for light cut-ting at extremely high speeds, is that the two essential elements of an electric motor-stator and rotor—are built integral with the headstock. Instead of the usual gears and belts, the headstock contains a stator bolted to the casting, and a rotor pressed onto the spindle. This motor head operates at 5 hp at top speed, and is said to run quietly

without vibration at speeds as high as

3600 rpm.

A simple electric start-stop box replaces the usual levers and handles, re-



sulting in neater appearance and easier operation. A touch of the start button sets the spindle whirling rapidly to any pre-selected speed. A touch of the stop

#### NEDCO

#### SANDING—RUBBING MACHINES

SOLVE YOUR SURFACING PROBLEM



THE NEDCO COMPANY WALTHAM MASS

#### TOSCO WAY CURTAINS FOR MACHINE TOOL BEDS



Protects ways on Planers, Mills, Grinders, Boring Mills, etc. — Keeps chips and abrasive dirt out of ways — Prolongs life saves costly repairs and of machine overhaul time.

Rollers constructed of seamless steel tubing with special long life springs. Curtain is of rubberized material impervious to oil and cutting compounds.

3 Standard sizes. Special sizes to order.

Installed easily with simple brackets.

TOOL SUPPLY

24 E. Bethune Detroit 2, Mich. button electrically brakes the spindle to a smooth, quick stop within a matter of seconds.

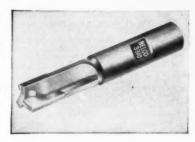
All controls are less than arm's length from the operator, including the new finger-touch speed-change handle located in the head end leg.

Various attachments such as those used on the standard 13", 17", and 20" LeBlond Rapid Production Lathes are also available for the new motor head. The range and scope of the machine may be further widened by LeBlond engineering service in designing and producing special tooling for difficult production jobs.

#### **NELCO 3-FLUTE MILL**

Development of an unusually effective Carboloy-tipped 3-Flute End Mill has been announced by the Nelco Tool Co., Inc., 370 Hamilton Ave., Brooklyn 31, N. Y.

Designed to step up production and at the same time overcome many milling obstacles, the 3-Flute end mill provides more chip-room and thus obtains cooler and freer milling. This feature decreases the chance of work overheating and twisting.



According to the manufacturers, exhaustive tests by Nelco engineers revealed outstanding performance in comparison with other methods. According to the makers, in the milling of a "keyway" the 3-flute end mill finished the job much smoother and in one-sixth the time consumed in milling the same piece with a high-speed steel end mill.

Production hours are saved, the manfacturers state, by the dual quality which enables the Carboloy-tipped end mill to plunge into any metal or plastic and mill in the same operation. Constructed to eliminate chatter it mills so

# NAME IMPLIES

TRU-CUT engineers have combined the sound fundamental of metallurgy with an advanced degree of skill in developing a new heat treating process of high speed steels, resulting in one of the greatest machine tool efficiency changes in tool history

Tool Bits • Center Drills Key Seat Gutters • End Mills Milling Cutters • Form Tools

Write for Illustrated Catalog
FEW TERRITORIES OPEN

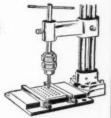


14236 BIRWOOD AVE.

Detroit 4, Michigan

#### BERGER SENSITIVE HAND TAPPERS

Two Sizes 0-1/4" and 5/32"-1/2"



Precision-built Tapping Fixtures for tool room and limited production work. One tap chuck only takes care of entire tapping or reaming range. Lapped spindle and long guide bushing assures perfect alignment at any tap position, prevents bell-mouthed holes, eliminates tap breakage and guarantees square thread axis and perfect thread fit. 1/2" Tapper comes with ratchet in head.

#### TOOL SPECIALTIES CO.

RAYMOND-COMMERCE BLDG. NEWARK 2, N. J. smoothly that a finishing cut is either not required at all or to a much lesser

degree.

The new end mill is manufactured for use on all types of alloy steel, cast iron, brass, bronze, and plastic material. Sizes range from %" to 2" diameter. Additional literature is available on request.

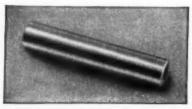
#### LANDIS HOLDING FIXTURE

A special work-holding fixture has been developed by the Landis Machine Co. for use with its Landmaco Threading Machine for threading fuse adapters. This special fixture has an arbor which is designed to support the adapter on bore, centering the work piece on the conical counterbore, which is machined to provide a seat for the fuse. A pin properly located at the base of the pilot arrangement engages one of the wrench notches to provide a driving means.

notches to provide a driving means. In operation, the fuse adapter is retained on the holding fixture by means of a heat-treated cut-out washer which is dropped over a seat provided near the end of the arbor. The adapter then is securely positioned by means of the handle of the fixture which, when rotated in a counter-clockwise direction.



draws the work piece tightly against the conical seating surface.



# DANLY

PRECISION DOWEL PINS

STANDARD AND .001 OVERSIZE

Hardened and Precision ground to a tolerance of  $\pm$  .0001 of an inch. Available in .001 oversize for repair or renewal work.

#### DANLY MACHINE SPECIALTIES, INC.

2100 South 52nd Avenue • Chicago 50, Illinois

Milwaukee • Detroit • Cleveland • Dayton Rochester • Philadelphia • Long Island City Ducommun Metals & Supply Co., Los Angeles

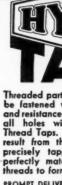


This BELT SURFACER is accurately balanced and sterdily built for hard constant use. It is semonth running and adjustments are quick and convenient. Abrasive belt is 6x42" handling a wide range of work speedily and accurately, Let us end bulletin giving full details, covering our complete line of bench and floor type surfacers, 6" to 20" sizes.

Let us send bulletin giving full details.

PRODUCTION MACHINE CO.

# Accurate Tapping means Stronger Fastenings



EYPRO TAPS

Threaded parts of your assembly can be fastened with increased strength and resistance to vibration by tapping all holes with HY-PRO Ground Thread Taps. Strong, tight fastenings result from the close tolerances of precisely tapped threads that are perfectly mated with screw or bolt threads to form an enduring union.

PROMPT DELIVERY. Many special as well as standard tape in stock.

COMMERCIAL, PRECISION SPECIAL

GROUND THREAD TAPS

Send for Catalog on Company Letterhead

**HY-PRO TOOL CO.** 

New Bedford, Mass., U.S.A.

The entire unit is applied to the standard machine carriage similarly to the standard carriage front application which permits both horizontal and vertical adjustment.

#### PLASTIPAK PROTECTIVE COATING

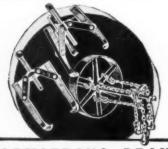
Plastipak, a moisture, acid and alkali protective ceating, that can be applied at room temperature to a product by either dipping or spraying is announced by Puritan Co., Inc., Rochester (6), N. Y. It is a resinous compound that dries quickly in air and forms a clear, tough, elastic, transparent or colored film. It adheres tenaciously to the product to which it is applied but can be quickly and easily stripped off in one continuous sheet when desired.

Plastipak has been applied successfully to all kinds of metal parts, including cutting tools, gears, drills, taps, axes, cutlery, as well as to sheet metal, and to wood products, glass and porcelain. In actual life tests Plastipak is said to show no deterioration after exposures of long duration and retains its transparency remarkably well. High dielectric strength



of Plastipak makes it a valuable material for the radio and electrical fields as it provides both moisture protection and insulating properties,

Applied at room temperatures, no special tanks or equipment are required for the application of Plastipak. It also dries in air so that no forced drying is required. Easy to handle and simple to apply. Plastipak provides an efficient way to protect and package all types of products—in process, in shipment and in storage, against exposure to moisture, alkali and acid conditions.



#### ARMSTRONG - BRAY GEAR AND WHEEL PULLERS

PROMPT SHIPMENT

ESSENTIAL TOOLS

Write for Catalog Sheets showing STEEL-GRIP Standard 2 and 3 arm Wheel Pullers. special Battery Terminal, Pitman Arm, Fan Pullers and CHAINGRIP Universal Pullers.

#### ARMSTRONG-BRAY & CO.

"The Belt Lacing People"

5364 Northwest Highway, Chicago 30, U.S.A.





#### QUICK ACTING INDESTRUCTABLE CAM DOGS

FAST - RIGID - POSITIVE - DRIVE AND NO MARS Operates by a flick of the thumb. No wrench required

 $\frac{1}{6}$  To  $\frac{3}{4}$  Capacity  $\frac{3}{6}$   $\frac{11}{6}$   $\frac{11}{6}$   $\frac{11}{6}$   $\frac{11}{6}$   $\frac{11}{2}$   $\frac{11}{2}$   $\frac{11}{2}$   $\frac{11}{2}$   $\frac{11}{2}$ Style \$3.00 4.00 5.00 6.00

Quick acting cam dog that fills a long need. Possesses a sure non-marring grip—
the greater the resistance, the tighter it grips, yet releases by a flick of the thumb.
This precision built dog has a tool steel cam wide enough to dispense with brass
shims, that will not dig in or mar.
Time is an element in production, use the tools that use it well. Order now, immediate delivery.

Representatives in principal cities wanted

GEORGE WHALLEY CO.

Dept. 101, 5005 Euclid Avenue

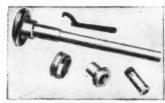
Cleveland, Ohio

#### WENDT-SONIS OFFER FLY CUTTER

Longer service life and ready adaptability are features claimed by a new universal fly cutter introduced by the Wendt-Sonis Co., Hannibal, Mo. This cutter is designed to do all kinds of ordinary and step milling operations on all types of materials.

Only one cutter body is needed to handle 75% of milling jobs, since the inserted teeth are easily interchangeable. Unusually low maintenance cost is achieved because the cutter body lasts indefinitely.

Durability and savings in power are other important qualities stressed in connection with this new cutter. Blades may be easily removed for sharpening on an ordinary bench grinder.



#### COMPLETE COLLET CHUCK ATTACHMENT

Collet Closing Sleeve is hardened and ground inside and out; guaranteed to .001" accuracy. Hand Wheel is web type and completely machined. This makes a perfectly balanced and true running wheel of desired size to assure operator maximum grip. A ball thrust bearing is mounted in the hub of Hand Wheel producing easy and free operation when applying or releasing tension on collet.

Can be supplied for any size lathe to take Style 3c. 2a, 4c, 5c collets.

Inquiries invited.

September, 1946

MACHINE TOOL BLUE BOOK

287

#### BULLARD ANNOUNCES THE MAN-AU-TROL SPACER

PIN-POINT precision in the drilling of holes in metal parts without the use of jigs, and at a saving in time of 20% or better, is now reported possible thru a device which has passed exhaustive tests at the Bullard Co., Bridgeport, Conn.

Called the Man-Au-Trol Spacer, this unit has been seen by engineers from many industries. They have expressed their belief to the Bull-ard firm that it is the greatest basic improvement over the method given to the world 150 years ago by Eli Whit-ney, when the Yankee inventor first achieved in terchangeability of parts thru the "thingamajigs" that have become today's jigs and fixtures. The potential impact of the Man-Au-Trol Spacer upon industry is

indicated in a statement from the Bullard plant that drill jigs and special tools costing about \$500,000 to make will now become scrap at the machine tool plant.

The Spacer consists of a heavy flat table, which moves either laterally or longitudinally on its base under an accurate drill spindle fixed rigidly in one position. With the work clamped in place, the table is hydraulically traversed from one pre-determined position to another by means of two selector controls; one for lateral positions, the other for locating longitudinal positions.

Setting of the selector dial by operator determines which one of a number of



cylinders is to receive the hydraulic pressure. A piston in the cylinder reacts to thrust of the pressure, thereby moving the table. Motion continues until the piston reaches a positive stop. Position of this stop may be varied and selected thru this stop may be varied and selected thris screw adjustment. Once the stops have been set, the work-carrying table will return to them with extreme accuracy. There is one hydraulic cylinder for each longitudinal and transverse motion.

Thus, if 10 cylinders were provided for each of the two directions, there would be 100 positions available. Force from a balanced master cylinder, working in conjunction with the force of any active cylinder, provides a rapid but smooth

## ATTENTION TOOLMAKERS BORING CHUCK . . . \$12.50

36" ADJUSTABLE IN THOUSANDTHS . . %" TOOL DIAMETER

SMITH BORING CHUCK CO. 12 CRESTWOOD DRIVE





DRILL JIG

## BUSHINGS

A.S.A. STANDARD types and sizes in stock for immediate delivery.

Excellent delivery on NEW GAGES and GAGES salvaged by HARD CHROMIUM PLATING.

Write today for particulars



ECONOMY TOOL & MACHINE CO.

# ALMOND Triple Jaw DRILL CHUCK

The Almond Three-Jaw Drill Chucks were pioneers in the field of drill chucks. Since 1872 they have played a necessary part in the logical procedure of machine developments.

Almond Chucks are furnished in nine sizes with capacities from 3/16 to 1". They are made for heavy and light duty types with taper or threaded arbor hole—to fit all machine tools and portable tools.



Write for complete details.

The Original

Manufacturers

of Drill Chucks

T. R. ALMOND CO.
ASHBURNHAM, MASS., U.S.A.

motion from one location to another and locks the table against its stop.

Hydraulic power to operate the Spacer is provided by a self-contained pump operated by a constant speed motor which is the only electrical equipment required.

To demonstrate the Man-Au-Trol Spacer's accuracy, Bullard officials set it to drill a pattern of four holes in a %" thick square of steel. With one piece finished, they drilled the same pattern independently in another piece of steel of the

One steel plate was placed on top of the other and four steel pins, super-finished to a diameter about .0005" less than the holes, were inserted. The holes in both pieces matched perfectly, the pins creating a slight vacuum that caused a "pop" when they were withdrawn. By removing any three pins and rotating one plate on the remaining pin, every possible com-bination of holes in the plates was tested in the same manner. In each case the pins demonstrated the sliding fit that proved not only the accurate location of each hole, but that each had been drilled in a plane precisely perpendicular to the surface of the steel.

Important economies which the Man-Au-Trol Spacer will make possible, were shown in drilling, reaming, counter-boring and tapping operations of parts for Bullard machine tools. One lot of 74 pieces customarily required more than 70 hours for drilling, using a jig. Use of the Man-Au-Trol Spacer saved better than 10 hours. The jig, now scrapped, cost close to \$350 to fabricate. Another piece, put thru in a lot of 134, would ordinarily have required 20 hours. On the Man-Au-Trol Spacer four hours were saved and the cost of producing the jig-\$75—was eliminated. Set-up times were included in calculating results of all tests.

Bullard engineers attribute these savings to a number of measurable causes. It is difficult, for example, to maneuver the spindle of a radial drill accurately over a hole previously drilled. As a result, the operator customarily changes tools to complete all work on a hole while the spindle is in place. However, the Man-Au-Trol Spacer will move the work to a great number of pre-deter-mined positions with precision, and make it possible for the operator to use one drill, for instance, until all its work is done before changing to the tap or other tool required to finish the operation.

Where the new device will end the use of drill jigs, the high cost of designing and fabricating them will be gone. Similarly, there will be no problem of jig storage, inventory, inspection and maintenance, or of delays to production while a jig is being manufactured. Again, there will be no waiting by an operator while a jig is brought from stores, nor will there be the cost of transporting it to him.

With the Man-Au-Trol Spacer, operator fatigue is at a minimum. Since the drilling head is in a fixed position on the rail and the table moves the work effortlessly past the operator while he stands in one position, hand cranking for positioning the tool is eliminated. The handling of jigs by jib cranes or heavy overhead cranes is eliminated.

Inspection likewise becomes simplified. First-piece inspection is all that is necessary. Once a piece has been spotted with the drill and the location of the holes checked by the inspector, the Man-Au-Trol Spacer will duplicate that pattern with unfailing accuracy, insuring abso-

lute interchangeability.

Experience of several months has shown that where the Man-Au-Trol Spacer replaced jigs, there have been no instances of spacing errors greater than permissible tolerances. During its period of operation at the machine tool plant, no part was ever scrapped because of error in spacing.

The Man-Au-Trol Spacer may be applied to various types of drilling ma-

chines.

The new device will be made in a variety of sizes, from one with a workcarrying table measuring several inches square to others capable of handling massive work.

WILLIAMS JOINS DIAMOND WHEEL

B. D. Williams has recently joined the sales staff of Diamond Wheel Industries, Inc., 57 E. Jackson Blvd., Chicago 4, Ill. Mr. Williams has been connected with the steel and machine tool industry for a long time in a sales and service engineering capacity.

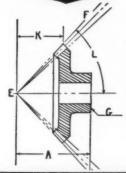
#### SCREW FORMING MACHINERY

An interesting new bulletin has been issued by the Asa S. Cook Co., Providence 7, R. I. It illustrates and describes machinery for the manufacture of wood screws, namely (1) the open die header; (2) shaver and slotter; and (3) threader and pointer, comprising the three essential machines to convert wire into finished screws.

This company also manufactures a ball bearing wire reel stand; automatic slotting machines; automatic pointing machines: automatic cap screw shavers and pointers and automatic cap screw

shavers.

# Problem



# Here's the and here's the Answer **EASY BEVEL GEAR GAUGING**

No Long Calculations No Involved Set-up

With Herkimer sine bars and bevel-gear gauges, anyone with ordinary gauging experience and ability to read blueprints can quickly and accurately check all important bevel gear dimensions and relations. Production gauging made easy.

> Write for Free Copy of Bulletin 100



BEWARE OF

IMITATIONS

HERKIMER TOOL & MODEL WORKS, 108 King St., Herkimer, N.Y.

# MODEL No. 16 "SPECIAL"

CONSTRUCTED AS PER SPECIFICATIONS OF U. S. NAVAL AIRCRAFT FACTORIES

### BUTTERFLY FILING and SAWING MACHINE

(Die Making Machine)

This is a very heavy, powerful machine and is designed for extra heavy filing and sawing, but it performs small work just as well. This type of machine is usually adopted in Ammunition Plants, Airplane Factories and machine shops plane factories and machine shops where heavy and precision filing and sawing is desired. We also manufacture smaller models—Model D-10" Table: Model E.L.—12" Table. Model No. 14—14" table and heavy pedestals for all our machines.

# 161 GRAND ST., NEW YORK

Phone CAnal 6-5170



Registered U. S. Patent Office

#### "HY-MAC" SPECIAL 4-STAGE MACHINE

A special purpose four stage machine for the drilling, spotfacing, counterboring and tap-ping of the vacuum holes in intake manifold been completed by Hy-draulic Machinery Inc., 12825 Ford Road, Dear-born, Mich.

The cycle of operation is entirely automatic ex-cept for loading and unloading. Cycle:—(1) Part manually loaded and clamped into position; (2) Upon closing Safety Door -electric contact is made and the machine auto-matically indexes to po-sition, all heads moving forward and completing the cycle of drilling, spot-

facing, counterboring and tapping, (During cycling time of the heads another part is loaded). (3) Part is unloaded.

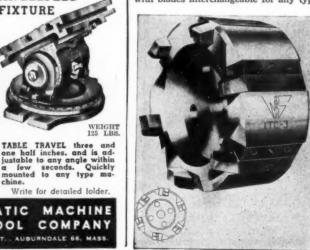
Production rate:-120 manifolds per hour. Machine is hydraulically operated.



electrically controlled and arranged with safety features, provisions being made to prevent indexing until part is properly clamped in position. All hydraulic power and control valves are mounted in the base with access doors for servicing.

#### CARBIDE CUTTER

A new inserted tooth carbide cutter, with blades interchangeable for any type





AUTOMATIC AND TOOL

132 CHARLES ST. AUBURNDALE 66. MASS.

of milling job, is being introduced by the Wendt-Sonis Co., Hannibal, Missouri. It is readily adaptable to standard machin-

ery.

The new cutter has an added safety feature in the special type wedge which prevents blades from slipping out while in operation. Blades may be removed and ground on an ordinary bench grinder. No special equipment is required.

This line is standardized and is now

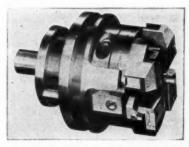
available.

#### TAPER ATTACHMENT DIE HEAD

Landis Machine Co., Waynesboro, Pa, has developed a 9/16" Lanco Taper At-tachment Die Head having a capacity of ½" to ½" standard pipe threads. It is of the rotary type and adaptable

on the rotary type and adaptant to any machine having either a leadscrew or lead cam. It can be furnished with special shank and flange required for adapting it to different machines. Tapered threads are generated with the

Die Head the same as straight threads in that they are formed with the chaser throat. This eliminates chaser leave-off marks when Die Head opens, such as is experienced when using plunge cut or cutting tapered threads with full width of die.



It is said that these Die Heads fitted with Alternating Tooth Tangential Pipe Chasers have proven extremely successful on the threading of stainless steel. The combination of Die Head and Alternating Tooth Chasers prevents tearing on the crest of the thread since the chip is formed only on one side angle of the thread.

#### DELLOY PRECISION CASTINGS

Precision castings, are available thru the Delloy Metal Corp., Erie Ave. at "K" St., Philadelphia, Pa. Castings are avail-

# ELECTRIC HAMMERS



#### SAVE MONEY -TIME AND LABOR



Drilling and Cutting concrete and masonry-

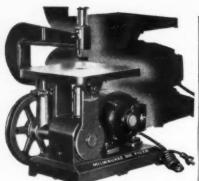
for anchor bolt holes, channeling for conduit, etc.





Write for new Catalog 464

SYNTRON CO. HOMER CITY, PA. 300 LEXINGTON



# Designed FOR CLOSE-LIMIT SAWING

Tool and Die Makers like the Milwaukee Die Filer for two basic reasons:

- The Saw Overarm and File Roller Support Arm are easily interchanged in a few minutes...reducing set-up time to a minimum.
- Sawing is done to extremely close limits
   . . . leaving very little metal for subsequent filing.

The net result is fast, clean, accurate workmanship that really "steps-up" tool and die fabrication.

**NEW SAFETY GUARD** 

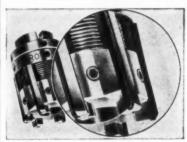
One-piece, all-metal guard now available to all owners and purchasers of the Mil-waukee Die Filer, atslightextra cost. Easily installed, it gives operator complete protection, yet does not interfere with speedy shifting of drive belt.





able of cast alloy in the chromium, cobalt and tungsten range, with hardnesses varying from 38-58 Rockwell C scale, "as cast." Commercial tolerances run to plus or minus .005". On certain small applications, these can be held to plus or minus .002". Net weight per casting varies from one ounce to three pounds. Delloy precision castings have high resistance to heat, corrosion, abrasion, or a combination of these factors, and are valuable because they eliminate heat-treating, and reduce subsequent machining and grinding to the minimum.

#### FULL LENGTH CARBIDE BLADES



A new line of Heavy Duty Solid Shank and Shell Type Expanding Reamers, featuring full-length carbide cutting edges to permit precise reaming operations at high speeds, has been announced by Metro Tool & Gage Co., 4240 W. Peterson Ave., Chicago 30, Ill. These Reamers are also available with high speed steel blades.

According to the manufacturer, these Reamers are designed with a low expansion angle to lessen the O.D. grinding when resharpening and have a 1/16" blade overhang to increase rigidity without loss of chip clearance. This permits extra long reamer blade life.

Chrome plated and precision made of high grade heat-treated alloy, these Reamers are available in cutting diameters of from 1" to 6". Shell arbors are furnished with straight or Morse taper shanks. Descriptive information including specifications and prices, is included in a colorful 4-page Bulletin available on request from the manufacturer.

#### TURRET DIAMOND HOLDER

A new automatic, self-centering turret diamond holder enables grinder operators



SHOWING NEW BANGLE ROOTH THREET DIAMOND HAIDER IN USE DRESSING EMERY WHEEL ON CENTER GRINDER ST POSITION

30" DRAG ANGLE

SHOWING NEW 3 ANGLE BOSTH TURRET DIAMOND HOLDER IN USE DRESSING EMERY WHEEL ON CENTER GRINDER. 2 ND POSITION

10" DRAG ANGLE

SHOWING NEW 3 ANGLE BOOTH TURRET DIAMOND HOLDER IN USE DRESSING EMERY WHEEL ON CENTER GRINDER

> 3 RD POSITION 10' DRAG ANGLE

to get the utmost in use from his diamond by providing a range of three different degree angles:-30, 20 and 10°, each to its complete extent by rotation of the diamond nib successively in the 30, 20 and 10° angle holes and the mechanical action of this turret holder automatically centers the diamond point in each of the three varied angles directly at the point of grinding on the abrasive wheel.

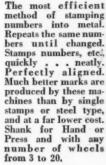
According to Sheldon M. Booth, President of the Diamond Tool Co., 938 East 41st St., Chicago 15, Ill., this accessory should double diamond life and lessen consumption of wheels. It should improve grinding accuracy and avoid destruction of diamonds by wheels becoming "outof-round" due to dull diamonds with consequent "beating" of the diamond by the "out-of-round" wheel.

CUTTING FLUID BULLETIN

Stuart's Technical Bulletin No. 4 is a 13-page booklet version of a paper en-titled "Cutting Fluids, an Appraisal and an Apology" presented before the Cin-cinnati Chapter of the ASME. It discusses types of cutting fluids and methods of testing lubricants, and illustrates the function of sulphur and other additives in cutting fluids by test results and graphs. Free copies can be obtained by writing to D. A. Stuart Oil Co., 2739½ South Troy St., Chicago 23, Ill.

# NUMBERA

#### Multi-Wheel Numbering Machine Model 70



Write for Bulletin BB-70.

## Model No. 70 Rotary Stamp (Patented)



Single wheel, for stamping on brass, aluminum, soft steel, plastic and wood, with a single hammer blow. All figures on 1 wheel, entire alphabet on 2. One stamp replaces 12 individual hand stamps, Characters from 16" to 3%". Also with shank for press.

> Bulletin BB-1H.

NUMBERALL STAMP & TOOL CO. HUGUENOT PARK STATEN ISLAND 12, N. Y.

Model 1H



#### How One Manufacturer Profits by BEAR DY-NAMIC BALANCING

Reports the Dynamic Air Engineering Co. of Los Angeles: "Bear eliminates the "Wobblies" of un-balance in high speed axial flow propellers faster than 20 per hour to a 3 mil displacement tolerance." Here, as always, the Bear machine is so small in size, and so quick, that the operation fits readily into production.

Any shop hand can learn Bear-Balancing in less than a day. Every Bear machine is widely adaptable within its range. Each balances bodies to the recognized standards. All are very reasonably priced. Write for new literature...chase the "Wobblies," of dy-namic and static un-balance... improve both product and sales! BEAR MFG. CO., Industrial Div., Dept. MTBB, Rock Island, Ill.



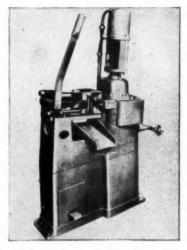
STATIC AND DY-NAMIC BALANCING MACHINES

#### INEXPENSIVE DIE CASTING

The characteristics of the DCMT Die Casting Machines recently announced by the DCMT Sales Corporation, Dept B., 401 Broadway, New York, N. Y., are:

1.—Simple, low cost machines specifically built for manufacturing small die castings at high production speeds.

2.—Prefabricated die blanks eliminate preliminary engineering work and assure suitable physical tie-in to the machine. In addition, they help to reduce die making time. Only single cavity molds are necessary since record operation speeds (1500 shots per hour have been reached) mean high production without resorting to costly multiple cavity dies. These factors result in quick, inexpensive dies.



3.—The DCMT Company offers a die casting, engineering, and die designing service to its customers and will arrange to have dies made and tested on DCMT machines for those who do not have their own die making facilities.

According to the makers, now the obvious economical advantages of the die casting process, heretofore confined solely to the mass production industries, have been brought within the scope of any manufacturer or parts producer, large or small.

Development of the easy-to-operate DCMT Die Casting Machines utilizing

296

prefabricated dies means that "On-the-Spot" die casting now becomes feasible and economical for hundreds of new in-

dustrial concerns.

The makers emphasize that many DCMT die casting machines are today in use manufacturing such items as hardware, golf clubs, cigarette lighters, toys of all kinds, ice cream scoops, zippers, novelties, jewelry, automotive parts, and countless other industrial parts.

### BENCH GRINDING—LAPPING MACHINE

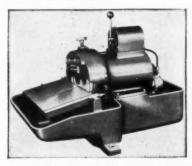
A bench-type grinding machine designed especially for sharpening carbide tools with a steel-bonded diamond wheel is announced by The Wickman Corp. Known as the Wickman-Neven Bench Grinding and Lapping Machine, it has found wide acceptance in England and is now available in the U S A and Canada thru the Wickman organization.

thru the Wickman organization.

Ample power for full use of a steel-bonded diamond wheel is provided by the one hp spindle motor, which is of special design to withstand very frequent reversal. A coolant pump is furnished as standard equipment, with a reservoir east

in base of machine.

For maximum convenience in sharpening both right—and left-hand tools, the direct-driven grinding wheel is reversed by a switch on top of motor. Wheel guard can be swiveled to right or left as required and clamped in position by a thumbscrew; and the 8" x 12" table is quickly set at any angle from 5° above horizontal to 15° below.



Full details and specifications are given an illustrated bulletin available on request from The Wickman Corp., 15533 Woodrow Wilson Ave., Detroit 3, Mich., or from A. C. Wickman (Canada) Ltd., P. O. Box 9, Station N, Toronto, Ont.

# Precision . . . .

# **TAPPING**

Leads changed in 90 seconds



# M&L

# PRECISION TAPPER

This is a fast rugged production tool capable of sustained accuracy. Flexible and adaptable, it cuts clean screw threads, handling up to 4" in nonferrous metal and 0 to 1½" in SAE steel. Class 3 and Class 4 gage fits and high production schedule are accomplished in normal operation even with unskilled help.

Tapping speeds are 95 to 350 rpm with reverse speed twice that of forward speed. Taps are guided by precision ground lead screws which are easily and quickly changed. Bulletin 143 gives full details.

Dealers' inquiries

## LECKINGER

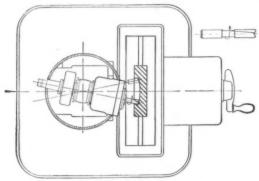
MACHINE AND EXPERIMENTAL CO. 716 N. Highland Ave., Los Angeles, Calif.

#### SUPERIOR SLOT MILLER

This interesting and useful machine was designed for milling slots in pieces of various shapes and sizes. It operates rapidly and accurately with a two lip end mill by oscillating the spindle head in an arc of a circle while the mill is revolving.

just been produced and is available on request from The L. S. Starrett Co., Athol, Mass.

It contains complete descriptions and illustrations of the many standard Starrett Dial Indicators together with information about other Starrett Indicators such as inside and depth dial gages, vi-



The part of the mill to be slotted is held in the fixture on the work table and is fed to the oscillating spindle on each end of the stroke. The amount of feed to the table is adjustable and the operation is automatic. The feed is automatically stopped at end of the cutting action or may be manually stopped at any time.

The end mill is held in a collet in the oscillating spindle. Width of slot is determined by diameter of the cutter, and length of slot by the chord of the arc of oscillation. The amount of oscillation is determined by an adjustable throw crank.

The machine is driven by a motor mounted in the base and means are provided to alter the speed of the spindle to suit the diameter of the cutter used. A pump in the base keeps the cutter flooded with coolant at all times.

This machine may be run at maximum speeds for any particular type of material and cutting action is continuous and positive. Due to automatic action and ease of operation, one operator may run several machines.

Further details are given in a new bulletin available from Superior Machine & Engineering Co., 1930 Ferry Park, Detroit 8. Mich.

#### STARRETT DIAL INDICATORS

A completely revised third edition of the Starrett Dial Indicator Catalog has brometers, cylinder gages and dial gages for measuring the thickness of metal, fibre, cloth, paper and other materials in sheet form. The catalog also includes complete information on American Gage



Design Committee specifications as well as descriptions and illustrations of the popular line of Starrett "Last Word" Dial Indicators.

#### GRINDING HANDBOOK

"Grinding Wheel Information", a 94page booklet compiled by the Mid-West Abrasive Co., Owosso, Mich., covers the complete history of grinding wheels and

## STEEL STACKING BOXES



**Immediate Shipment** 

Any Quantity

STYLE 600 STACKING BOX 10" x 16" x 5%"

\$1.11 ea.

F.O.B. Factory Stacks with No. 601 12" x 18" x 6%"

\$1.43 ea.

F.O.B. Factory Stacks with No. 602

Ideal all-purpose shop box. Sturdy all-welded construction. Heavy skids act as positive stacking lock and reinforce box at point of maximum wear. Other sizes and styles available.

PHONE-WIRE-WRITE

BAY INC.

3003 No. 16th St., PHILA. 32, PA. Bell Telephone: BAldwin 9-1805

# READY AT ALL TIMES FOR THE LITTLE JOBS

It is a life-saver to busy toolmakers to have a machine that does odd jobs on dies, jigs, fixtures, paterns and models quickly and accurately. The Linley Miller and Jig Borer is specially designed for this purpose. There is a real cost-reducing factor, too, since it relieves bigger machines for the more expensive, heavier jobs.

Only  $2\frac{1}{2}$  sq. ft. of space needed; table size  $(7'' \times 17\frac{1}{2}'')$  is ample. The Linley has 8 spindle speeds to 4250 r.p.m., velvet feed and no backlash in quill travel.

Consider these factors for time and money saving values.

Get Bulletin . . . now.

# LINLEY BROTHERS

663 STATE STREET EXTENSION BRIDGEPORT 1. CONNECTICUT



gives comprehensive explanations of grain sizes, types, and the fundamentals of grinding wheel operation. In addition to such special features as "Crush Form Dressing", "Tool Room Grinding", and "Centerless Grinding of Screw Threads", it contains specification data on all types of grinding wheels, a chart of recommendations, and is well illustrated with photographs and line drawings showing cross-sections of the various types of wheels and honing stones. Easy to read, this informative booklet may be obtained by writing the Mid-West Abrasive Co., Owosso, Mich.

#### HEAVY DUTY EXPANSIVE BITS



A new heavy duty Bruno Expansive Bit with ½" straight shank, for use in an electric drill or drill press, to bore holes ½" to 3½" in wood, is announced. Its unusual performance is said to be due to its sturdy construction. The center lip, which cuts away the core at center of hole, extends back to form a clamp which firmly holds the adjustable blade at the diameter set. The clamp is locked tight by means of a screw. Once locked in the positive wedge-lock V-groove the cutter remains securely in place.

An improved diamond-shaped screwpoint gives longer life by lessening chance of breakage. The lead screw is threaded finer than is usual for this type of tool and this feature helps pull the bit thru the wood, requiring only light pressure to cut quickly and cleanly. The threads are ground to correspond to the capacity of the tool. Thus, regardless of the diameter of the hole being cut, whether thru thin material or thick, clean, true holes are cut with minimum effort. A large open throat keeps cutters clean of chins.

The bits are equipped with two cutting blades—one long and one short—to cover the range of the tool. A graduated scale on the blade makes adjustment easy. This is in addition to the fixed cutter or center lip, which cuts away the material at center around the screw point.

The removable center-lip, or cutter, also serves as a clamp to hold blade. This facilitates replacement of all parts. The bits are equipped with blades forged from high grade carbon tool steel for efficient boring in hard or soft wood. Blades are easily sharpened in the conventional way, or replaced. With the shorter cutter, smaller diameter holes may be cut to any depth and the diameter range is from 1½" to 2-7/16" while that of the long cutter is from 2½" to 3½".

Further information may be obtained by writing the manufacturer, Bruno Tools, 9330 Santa Monica Blvd., Beverly Hills, Calif., Dept. No. 221.

#### SIZE CONTROL GAGE CATALOG

In a short span of years, gaging has assumed utmost importance. The close tolerances demanded of ordnance production brought gaging into its own.

Beside illustrating, describing and pricing the entire unit and components of Size Control reversible "Go and No-Go" plug and thread gages, snap gages, ring gages, twin-plug gages, and measuring wires, their new 20-page catalog gives data on salvage of war-time surplus gages, details the company's new centerless lapping machine, and tells about new gummed cut-outs of gages to be pasted on drawing paper, saving time in the drafting room. A master tracing sheet of various sizes of plug gages is included in the catalog.

Copies of this catalog No. 846 are available on request from the Size Control Co., Division of American Machine & Gage Co., 2500 W. Washington Blvd., Chicago 12, Ill.

## ESPECIALLY DESIGNED



Vonnegut Brush-Backed Abrasive Head with end cap removed, showing magazine loading of 32 strands of abrasive coated cloth.

#### for finishing irregular surfaces

The outstanding characteristic of the Vonnegut Brush-Backed Abrasive Head is its ability to adapt itself to the contour or irregularly shaped surface of any work-piece, by means of the brush pressure behind the shredded abrasive tips. It is being used for deburring, cleaning, polishing and finishing all kinds of metal parts.

Desired results may be obtained on different metals by using varying grades and grits of abrasive cloth. There is a correct grade and grit of cloth for every operation, depending upon the material of the product and the desired finish or end result required of the operation.

The Vonnegut Head does not heat. It maintains a constant diameter, without variation of abrasive cutting speed nor temperature. That is among the several reasons for its great efficiency.

To learn more about the Vonnegut Abrasive Head, send for Bulletin No. 53.

# VONNEGUT MOULDER CORP.

**1805 MADISON AVENUE** 

INDIANAPOLIS, INDIANA

MILLING - DRILLING - BORING ATTACHMENT (or Operations

Photo shows a special operation not suited to standard straddle mill set up but easily handled by means of a RUSNOK Milling attachment used horizontally on a standard milling machine, saving ene machining operation and accomplishing greater accuracy in finished piece parts. Uses many types of cutters on a wide range of work. Easily mounted—tilts to any angle. Large size spindle (No. 9 B & Staper). Takes ½º to 3¼º end mills. Large quill with 4º travel, counter balanced, hardened and ground. Six speeds 250 to 3000 RPM. Lever and worm feeds. ½ h.p. motor. Specially engineered by RUSNOK to meet modern demands for high speed. high precision, heavy duty end mill operations.

Prompt delivery.

Write for illustrated circular and prices.



4840 WEST NORTH AVE.

CHICAGO 39, ILL

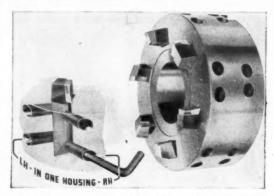
#### LOVEJOY ANNOUNCES "CUTSALL" FACE MILL

The Lovejoy Tool Company, Springfield, Vermont, announces a new face mill designed especially for modern milling practice.

Called the "Cutsall," it is a tool-bit-type mill with Carboloy cemented carbide blades, and embodies several unique features.

The housing is built to take either left- or righthand blades. It holds the blade face slightly back of center so that positive and negative radial rake can be obtained from the same blades. There are two set screws for each

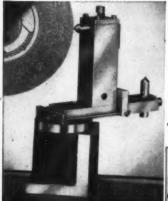
two set screws for each blade, one of which bears on the tapered base of the blade and provides for fine blade adjustment; the other is to lock the blade securely in the housing (see phantom view). The blades have extra large Carboloy cemented carbide tips and can be sharpened on an off-hand, ad-



justable table single-point tool grinder exactly the same as regular lathe tools.

Overall construction of the "Cutsall" is rugged and balanced and according to the makers, this explains its ability to make heavy cuts in tough stock at high spindle speeds. The "Cutsall" is available

# PRECISION DRESSING AT LOW COST with the "FORM-MASTER" ANGLE & RADIUS DRESSER



A sturdy, quality instrument. Designed by formgrinding specialists for accurate dressing of both angles and radii at low cost. Easily set with micrometer for radii—and with protractor or sine-bar for angles. All parts (except base) hardened and ground to close tolerances. Sealed ball-bearings for long-life and accuracy. Two 1/3 ct. diamonds and case included—\$150.00 complete.

#### Compare these features:

- · Large range
- · Chatterless and dustproof
- .0001" accuracy obtainable
- · Simple to operate
- Reasonably priced

\*Reg. U. S.
Pat. Off. Write for complete information.

Jes TO

TOOL CO. 477 Main St., East Orange 2, N. J.

Manufacturers of "Pluidmation" Form Dressers

in 6", 8", 10", and 12" diameter sizes. An additional convenience and economy is that one size of Carboloy tipped blade fits all four cutter sizes. Blades are tipped with either of two grades of Carboloy cemented carbide; one for cutting steel or one for cutting cast iron and non-ferrous metals.

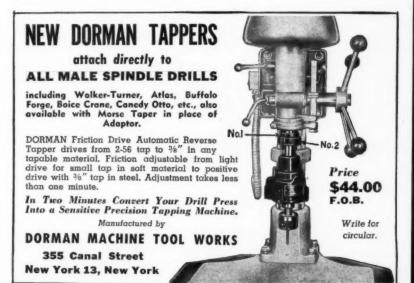
#### NO. 6 EXCEL UNIVERSAL

A new No. 6 Cutter and Tool Grinder known as the Excel Universal is offered by the Covel Mfg. Co., Benton Harbor, Mich.

Designed to sharpen reamers and milling cutters in a wide variety of shapes and sizes, the new unit is also adaptable for cylindrical and internal grinding purposes. A whole page full of these applications is illustrated in a new bulletin introducing these machines. A number of special attachments are also shown. These attachments increase the versatility of the unit and add greatly to its usefulness.

Some of the specifications undoubtedly will interest prospective users. Longitudinal travel of table is  $14^{\prime\prime}$ . Vertical movement of grinding wheel spindle is  $7^{\prime\prime}$ . Cross movement of saddle is  $64^{\prime\prime}_2$  and work  $8^{\prime\prime}$  in diameter can be swung.





The machine swings work with right and left hand tail stock 16" long. Table surface is 4" by 24", maximum size of grinding wheels is 6" diameter by ½" face.

Main spindle motor is 1/3 hp. 1750 (60 cycle) or 1425 (50-25 cycle) rpm. Headstock motor is 1/30 hp. Floor space required is 36"x38".

#### RECORDING SURFACE ROUGHNESS

For those who need written records of the surface roughness measurements of parts, new Profilometer Reading Recorders have been developed. Operating as attachments to the Profilometers, the Reading Recorders provide continuous chart records of the average roughness of the surface being measured.

The charts, which are read in micro-inches like the Profilometer microinch meters, are useful in obtaining more de-tailed information on surface roughness, such as the location of rougher or smoother areas, and in supplying cus-tomers with records of the surface fin-ishes on parts delivered to them.

The Recorder attaches at the meter jack provided on all Profilometers. No adaptations of existing Profilometer



equipment are necessary. For a descriptive leaflet, address Physicists Research Co., Dept. 3, Ann Arbor, Mich.

#### QUALITY CONTROL CONFERENCES

Two Conferences on Quality Control and closely allied topics were scheduled at the Providence, R. I. Plant of Federal Products Corp., 1144 Eddy St. The first of these was held August 13-16. A second Conference is planned for September 10th to 13th.



# LATEST CATALOG ON CARBIDE - TIPPED HIGH PRODUCTION TOOLS

A COMPLETE listing of our standard design tools which meet 90% of the requirements for all hole finishing. Reamers - spot facers - form tools - combination tools and specials.

WRITE FOR YOUR COPY TODAY

SCHMARJE TOOL AND ENGINEERING CO. MUSCATINE, IOWA

These Conferences are being sponsored at this time to meet a growing demand for authoritative discussion of the subject, so vitally related to the needs of industrial production now, and in the immediate future. The specific purpose of the August Conference was to demonstrate, under actual practical factory conditions just how and where Quality Control, Statistical methods, Gaging and inspection is made to pay. The program included a practical description of the statistical technique and profitable applications of Quality Control. The Shop Use of Acceptance Sampling, Sequential Sampling, Per Cent Defective Methods of Scrap Control, Batch and Chart Control, Visual 100% and Patrol Inspection were also discussed. A new and most important section of the program was a period devoted to gage design, a subject hereto-fore held in the hands of experts.

Gaging by the various mechanical, indicating, electric and electronic methods was also demonstrated on practical shop applications. Air Gaging also was shown. The management aspect of Quality Control, including Training Cost and Justification angle was dealt with.

This series of discussions is being lead by specialists, selected as particularly

competent in their respective fields. Members of the Sales Engineering Staffs of Pratt & Whitney Co., Hartford, and Taft-Pierce Mfg. Co., Woonsocket, R. I., will collaborate; together with:— R. A. Cot-ter, Quality Control Engineer U. S. Time, Inc. Waterbury, Conn.; W. R. Purcell, Quality Control Manager Sylvania Electric Products, Salem, Mass.; C. J. Hudson, Quality Manager, The Norton Co., Worcester, Mass.; John Greacen, Chief Inspector, The Bristol Co., Waterbury, Conn.; C. J. Kirchen, Statistician, Remington Arms Co., Bridgeport, Conn.; Fred Stone, Director of Engineering, Wanskuck Mills, Providence, R. I., and Dr. J. M. Juran, Wallace, Clark Co, and New York University, N. Y. C.

#### DUCTILITY TESTER

A new catalog page has just been re-leased by Steel City Testing Laboratory, 8843 Livernois, Detroit 4, Mich., that completely describes and gives specifications of the new model PA "Superior" Ductility Testing Machine. There are two models—a PA-2 with a 15,000 lb. capacity for stock up to 1/8" in thickness and a model PA-3 with a 30,000 lb, capacity for stock up to 1/4" thickness.



Have you a noisy gear train to correct? Try on Atlantic noiseless gear, accurately cut of nonmetallic Bakelite.

Atlantic makes gears rigidly to your specifications, proven by precision inspection before delivery. All types, all gear materials, all sixes to 60", all quantities. The same close personal attention to orders, whether it's one gear or a hundred. Send us your specifications or gear samples for our auotations and delivery dates.

ATLANTIC GEAR

#### POWER SHEARS



16-14-12 GA. CAPACITIES 36"-42"-60" LENGTHS FAST — DEPENDABLE Write for Literature

WHITNEY METAL TOOL COMPANY

### WALTON EXTRACTORS

For Removing
Broken Taps . .

Try these handy tools on 30-DAY FREE TRIAL OFFER

When taps break off, it is convenient as well

it is convenient as well as economical and timesaving to have a set of Walton Tap Extractors at hand. These tools are designed especially to remove broken taps, effectively, easily, and quickly, . without damage to threads. Write for folder No. 12 and details of free trial offer.

#### THE WALTON COMPANY

94 Allyn Street

Hartford 3, Conn.

#### SIP 3-K JIG BORER



The Cosa Corp., representatives in the USA for Societe Genevoise D'Instruments de Physique of Geneva, Switzerland, announce new SIP Jig Borer, Type 3K. These tools are known thruout the world for high precision and ease of operation and the 3K, which is of the planer type, has a table working surface of 20½" x 15". It incorporates built-in measuring screws and micrometer heads. There are no loose instruments to be handled for locating hole centres and direct readings are made to 0.0005" on the verniers of large divided drums. Automatic correctors compensate for any source of error in the measuring devices and there is a guaranteed accuracy for all settings of work table and spindle saddle of 0.0002".

# 8

#### Save Space and Lifting

Yohe Racks take less floor spacehold more slock and require less lifting. Four arm rack, 51" high stacks, 10,000 lbs. Five arm rack 57" high holds 12,000 lbs. flat or round stock—at safe lifting heights. Use against wall or back-to-back in center of room.

Let us send details and prices.

WM. S. YOHE SUPPLY CO. 503 Mahoning Rd., N.E. Canton, Ohio

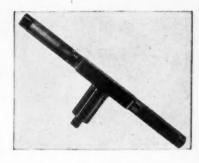
The 3K has eight spindle speeds ranging from 75 to 2000 rpm and the six automatic feeds in either direction assure rapid operation on a complete variety of work.

The cross-rail is traversed vertically by a motor driving two strong elevating screws of high precision which guarantee accuracy of horizontal position. These screws extend downwards into the bed and are automatically lubricated by oil baths.

The machine is also supplied with a special guiding arm which facilitates the machining of very small holes and a depth measuring device can be mounted like the guiding arm on the spindle head and permits boring head to be accurately limited. This depth measuring device can be used either as a sliding caliper or a comparator.

The 3K, besides being used as a Jig Borer whose accuracy is unquestioned, can also be used as a dependable and versatile measuring instrument.

T-HANDLE TORQUE WRENCH
A new T-handle heavy duty torque
wrench has been added to the line of

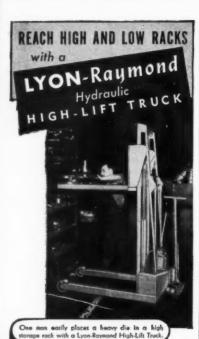


JO torque tools. The new Jote has a range to 90 ft lbs., and is equipped with needle bearings to eliminate friction. The wrench is 10" long over all, 3½" high, has a ½" square drive, and is chrome plated.

Like the smaller Jote wrench, it is preset at the factory or in the tool crib. At present it is being manufactured with just the non-ratcheting action, according to JO Mfg. Co., South Gate, Calif.



# ROGERS KNIFE GRINDERS



Ease! Convenience! Safety! All

three qualifications of efficient material handling are provided by this maneuverable, versatile Lyon-Raymond truck with . . .

- \* Hydraulic operation
- \* Fingertip lowering control
- \* Short turning radius; turns in own length
- \* 360° turning and operating radius
- \* Welded tubular and formed plate construction
- \* Timken Bearings in all wheels

Write for latest literature on this work-saving equipment.

LYON-Raymond CORPORATION Greene, N. Y.

#### CLAMPED-ON TIP TOOLS

Kennametal Inc., is now producing, for lighter machining jobs, two new types of tools having clamped-on advanceable Kennametal tips—Styles ICL and 2CL with offset shanks and Styles 11CL and 12CL having straight shanks. Among the operating and maintenance advantages claimed for these new tools are:

More consistent performance and greater durability from thermally strain-free

assembly; Smooth, unimpeded chip flow assured by perfected clamping arrangement, cor-rectly positioned;

Exceptionally strong Kennametal tip-diamond ground on bottom face-firmly supported by plane surface of heat-treated steel shank; Dull tips can be advanced, resharpened

time and again, and major part utilizedtip only is reground;

Fewer tools to stock—the shank serves as a permanent tip holder;

Tips of different grades can be inter-changed in same shank, thus adapting the tool for machining different types of metals.

The Kennametal tips for these new tools can be supplied with permanent, molded-in chip breakers, constant in depth, but adjustable in width by varying the amount ground from end, or side cutting edges.



Shank sizes now available include:  $1 \times x^{7''}$ ,  $1 \times 1\frac{1}{4} \times 9''$ ,  $1 \times 1\frac{1}{2} \times 10''$ . Larger sizes, for heavy duty work, are available in the established HD line of clamped-on Kennametal tools. Complete particulars are given in Catalog Supplement 2 which may be obtained from Kennametal Inc., Latrobe, Pa.

#### G-B-M COLLET STEP CHUCKS

In line with the increased use of Step Chucks on smaller lathes, The Gilbert Baker Midlam Co., Dayton, Ohio, have brought out a special Step Chuck and Closer combination for 6" and 10" Atlas, 9" South Bend, 10" Logan and 12" Clausings.

This combination provides a Closing Sleeve threaded for the Spindles of these lathes and with a tapered ring operating on the tapered head of the Step Chuck, giving more positive closure than the same action usually employed on a tapered shoulder of the chuck head.



The step chuck head, remaining unhardened, can be bored with a series of steps to fit any work to be held until the entire head-thickness capacity is exhausted. The threaded shank, hardened and spring-tempered to open the stepped chuck jaws when released, screws into the standard draw bar of the lathe, which operates the step chuck just like a collet.

operates the step chuck just like a collet. This special G-B-M Step Chuck and Closer will handle work up to 2¼" diameter and offers in addition, the same advantages of automatic concentricity and speed found in the regular line of G-B-M Collet Step Chucks.

#### "LOW TEMPERATURE" WELDING

A special issue of "The Eutectic Welder", monthly house organ of the Eutectic Welding Alloys Corp., 40 Worth St., New York 13, N. Y., contains some unusual photographs showing applications of the company's products to war-time metal joining problems. From delicate aluminum to such machinery as heavy stamping equipment, both production and maintenance low temperature welding are portrayed.

Two pages are devoted to pictures of the company's laboratories where new alloys and fluxes are developed. Of particular interest are three photo-micrographs taken at 500 diameters which vividly show the bonds possible thru the

use of the company's products.

# "Retool with Reltool"

Feature this Growing Line of

## FINE METAL CUTTING TOOLS

- Center Drills
- End Mills
- Center Reamers
- Tool Bits
- Driving Collars
- Circular Saws
- Slitting Saws
- Screw Slotting Cutters
- Formed Tooth Saws
- Side Chip Clearance Saws
- Jewelers' Saws
- Rotary Shears and Special Saws made to User's Specifications



#### DISTRIBUTORSHIPS AVAILABLE

Qualified Industrial Distributors who can provide adequate sales representation are invited to consider the Reltool Franchise. A number of choice territories are still available,



# SPECIAL!

Immediate Delivery



Send for Free 128 Page Catalogue

# HIGH SPEED SIDE MILLING CUTTERS

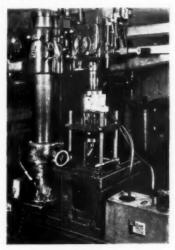
Diameter	Width	Hole	<b>Net Price</b>
3	1/4	1	\$4.80
3		1 1 1	5.11
3	3,8 1,2 1,4 3,6 1,2 1,4 1,5 1,6 1,7 1,7 1,8 1,7 1,8 1,7 1,8 1,8 1,7 1,8 1,8 1,8 1,8 1,8 1,8 1,8 1,8 1,8 1,8	1	5.33
3 3 4	vie.	1 1 1	5.62
3	1/2	1	5.92
4	1/4	1	6.66
4	15	1	7.47
4	3/8	1	7.47
4	175	1	8.36
4	1/2	1-11/4	8.36
4	5/8	1-11/4	9.10
4	3/4	1-11/4	9.83
4	7/8	1-11/4 1-11/4 1-11/4	10.57
5	1/4	1	11.16
4445555555555	1/4 1/8 3/8 1/2 5/8	1	11.16
5	3/8	1	11.16
5	76	1	11.16
5	1/2	1-11/4	11.16
5	5/8	1-11/4	12.34 13.46
5	3/4	1-11/4	13.46
5	7/8	11/4	15.75
5	1	11/4	15.75
6	1/4	1	14.56
6	16	1	14.56
6	3/8	1	14.56
6	1/4 5 3/8 1/2	1	14.56
6	1/2	1-11/4	14.56
6	5/8	1-11/4	16.13
6	3/4	1-11/2	17.74
6	7/8	11/4	20.99
6	1	11/4	20,99
7 7	3/4	11/4	25.42 29.79
8	3/4	11/4	33.76
0	2/4	11/4	
8	1	11/4	39.46

Send for Free 128 Page Catalogue

Eastern Tool Supply Co., Inc. 178 GRAND STREET NEW YORK CITY 13, N. Y.

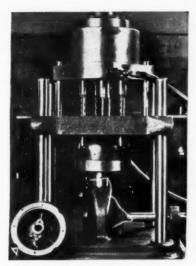
#### ZAGAR GEARLESS DRILLHEAD

The illustration shows Zagar Tool's standard multiple-spindle drilling head designed to drill 75 holes .080" diameter in a conventional hot water heater gas burner. Drive is by a Vickers hydraulic motor. Burner is fed into drills with an hydraulically operated ram.



Shown not only is a drill head, but a complete unit. With this it is possible to drill 80 to 100 burners per hour—a total of 100 times 87 or 8,700 holes per hour. It is necessary to use an hydraulic set-up because, primarily, the cast iron burners are now manufactured in various grades of hardness, depending upon the material available for castings. Therefore, speed of the drills and speed of feed have to be altered to produce burners with minimum drill breakage as well as to compensate for various degrees of hardness in the cast iron. With the hydraulic motor it is possible to regulate speed of the drills from 0 to 3,000 rpm. With hydraulic feed on ram, it is possible to vary the feed from 0 inches per minute to 20 feet a minute. Zagar is in a position to accept orders for the manufacture of multiple-spindle drilling equipment for any conventional type of gas burner and will furnish the entire equipment required.

The other illustration shows a close-up view of drilling set-up. This is a motor



end-housing for the G-E Co. Zagar made up the complete tooling, except for the standard Cleveland Universal Drill Jig. Thereon is a Series No. 2500 head 8" in diameter. Note particularly how head is tied into drill jig. Spacing of holes can be irregular. Head itself is a Zagar standard gearless drillhead, including position of leader-pin bushings. Ten holes are being drilled at one time.

The other picture shows the set-up on a Cincinnati-Bickford radial drill press. Many spindles mean many bearings and considerable heat. This heat is dissipated thru a specially provided water jacket in base of the head, which is in no way connected with the internal mechanism. Thru this head, with a conventional coolant system, a water soluble coolant is circulated.

#### CARBIDE TOOL CATALOG

A new carbide tool catalog is available thru the Willey's Carbide Tool Co., 1340 W. Vernor Highway, Detroit 1, Mich. This catalog, designated as No. 29 is quite complete covering their full line and is indexed for ready reference.

Pertinent data relative to the various tools they make, many illustrations, machining and other tables, all in large easy to read type, add to the attractiveness and usefulness of the catalog.

# TO RAISE PRODUCTION CUT COSTS

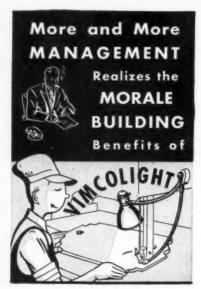
# THE READING BROACH KEYSEATER



The Reading Bench Machine does not require bushings or guides. No other machine like it. Very fast—capacity from 1/8 to 3/8 cutter. Low first cost—prompt delivery.

## READING MACHINE CO.

READING (CINCINNATI) OHIO



# DIRECT LIGHTING!

Watch work go faster . . smoother . . when machines are fitted with VIMCOLIGHTS. Adjustable on-the-spot lighting brings out the contrast between work and background areas . . takes the squint out of shadowy spots. When you use VIMCOLIGHT for better sight, operators respond with increased output and better work.

Vimcolights are designed for all manufacturers and users of machine tools. Designed to fit any machine . . easy to attach and remain steady in any position.

ON-THE-SPOT LIGHTING FROM ANY ANGLE



HI-POWER MAGNI-FOCUSER

Edroy Products Co., 480 Lexington Ave., New York 17, N. Y., manufacturers of optical and scientific instruments, an-nounces a new Magni-Focuser Binocular Eve Loupe. It is a Double Utility Hi-Power Magni-Focuser and is now in pro-

This new instrument is said to incorporate all the quality and optical advantages of the regular Magni-Focuser. In addition, it has the added advantage of a hi-power auxiliary lens which drops down in front of one eye in order to provide extra magnification when it is needed for some particularly precise job. When not in use the hi-power lens flips up out of the way so that most work can be carried on with both eyes using binocular vision, which provides depth perception, needle-sharp clarity, as well as the comfort of normal vision.



The finely ground and highly polished prismatic lenses used in the Magni-Focuser are scientifically matched and balanced and are of high quality optical glass. Designed to relieve eyestrain, and fitting over regular eyeglasses, this unit also has the added feature that the shade shuts out all overhead and side glare of lights and distractions. By using both eyes most of the time and high power only when it is necessary, extra years of seeing ability are added to a precision worker's vision.

Initial production of this new unit will be in focal lengths from 14" to 8" and from 4" to 2" with the auxiliary lens in place in front of one eye. These units will be designated as Models 13, 15, and 17, according to power of the lens. Powers with the auxiliary lens in place run from 5.25 to 6.25.

MARTON AIR VALVE The Marton 8-Way (3 Cylinder Consecutive) Hand Operated Air Valve was designed for control of 3-double acting Air Cylinders in succession, but one at a time. The detention mechanism in control lever permits return of third and

second cylinders without changing the position of the first cylinder.

The hard bronze valve disc is self-sealing as no packing is employed, and the valve body is of meehanite.



The valve illustrated is an addition to the patented Marton Air Control Unit which combines, pressure regulator, gauge, filter, lubricator, and control valve. Supplied in ¼", %", and ½", pipe sizes.

#### ALLIS-CHALMERS HANDBOOK

A 16-page letter-sized briefed handbook of electrical products suitable for a wide variety of industries is announced by Allis-Chalmers,

Well illustrated, the handbook de-scribes eight classifications of electrical equipment ranging frem a-c and d-c motors of ½ to 50,000 hp to electronic heaters. For easy reference, the booklet tabulates characteristics of motors from 1/2 to 75 hp and describes the construc-tion and application of many types of motors.

In connection with a description of the company's complete line of motor control equipment, the booklet offers data covering the type, maximum hp, volts and description of its motor controls. Similarly, in describing its complete line of multiple V-belt drives of constant and variable speeds, a table provides at a quick glance information relative to the type of sheave, number of grooves, belt sizes and hp best fitted for a particular pur-

The company's complete line of low and high voltage transformers, switch-

# A Tool Room Treasure!



### GRAHAM MULTI-PURPOSE VISE



Just like finding a needed jig or fixture already made, is the Multi-Purpose Vise with its assortment of jaws holding plain and irregular shapes, and its variety of attachments for repeat operation posi-



tion. Flush, square, parallel construction is a great aid. Sizes up to 124 lbs. for drill press, radial, shaper, miller, planer, grinder.

Request New Bulletin 41

#### GRAHAM MFG. CO.

51 Bridge St., East Greenwich, R. I.







#### **CUT WITH STRAIGHT KNURLS**

on Graham "Adjust-angle" Knurl Holder



Fitting lathe turret, this tool adjusts



straight knurls to cut wide variety of patterns on work up to 2½" dia. Shank to fit your turret.

Request Bulletin 41

Graham Mfg. Co. 51 Bridge St. E. Greenwich, R. I.

For precision internal gaging to fractions of .0001"—
COMTORPLUG



Used by trainee or "old hand," Comtorplug gives automatic precision to fractions of .0001". Patented expanding internal comparator shows ACTUAL SIZE (not a passing reading), front or back taper, out-of-round, bell mouth, etc. Rugged, practical for machine operators and bench inspectors.

Request New Bulletin 31

THE COMTOR CO.

62 Rumford Ave. Waltham 54, Mass.

boards, switchgear and circuit breakers, equipment for power generation and centrifugal pumps, as well as water conditioning chemicals and equipment, is also graphically described. Included with the descriptive matter on switchgear is a handy tabulation of metalclad vertical lift switchgear data.

Also appearing in the booklet is information on Allis-Chalmers welding equipment and arc welding accessories.

The handbook, B6452, is available on request from the Allis-Chalmers Mfg. Co., 655, Milwaukee 1, Wis.

#### AUTOMATIC METAL SAWING

Automatic pull-up and automatic gauging in lengths from ½" to 48" are made possible thru development of a mechanically controlled power saw announced by Peerless Machine Co., Racine, Wis. Faster, accurate sawing is claimed for this metal sawing improvement.

Metal is fed forward within a foursided saw-frame assembly which completely surrounds the work as the metal is being cut. When cut is completed, the conveyor feeds the pre-determined length of metal into the saw, the multiple barclamping vise releasing and setting automatically.

In case of accident or blade breakage, a blade-safety, micro-switch automatically stops machine. When the last remaining stub of metal on the conveyor—single bar, a nest of bars, billets, tubes or squares—contacts the limit switch, the cycle automatically stops.

The new mechanically controlled conveyor is built for the Peerless Mechani-Cut model in 7" x 7" and 11" x 11" sizes. A 14" Mechani-Cut is supplied only with a manually-operated conveyor.

The operation of the mechanically-controlled conveyor is fully described in a new bulletin, MC-51-A, now available,

#### AMPCO BERYL-TRODE

A new, coated Beryllium-Copper electrode, known as Beryl-Trode, is the latest copper-base alloy electrode offered by Ampco Metal, Inc., Milwaukee 4, Wis.

These electrodes have a medium weight,

These electrodes have a medium weight, flux coating required for stabilizing the arc, and produce a dense deposit. They can be used with either the metallic-or carbon-arc process.

Beryl-Trode is designed to weld parts made of Beryllium-Copper, such as, resistance welding jaws, seam welder wheels, etc. The deposits, when heattreated, develop high-hardness, high-strength values similar to the base metal. These electrodes are used for joining,

repairing cracks or defects in castings and for building up of worn surfaces.

Beryl-Trode electrodes are made in two diameters only—5/32" and 3/16" in 14" lengths.

#### THREADING MACHINE

A bulletin completely describing and illustrating their No. 16 Precision Threading Machine has been made available by the Geometric Tool Co., New Haven 15, Conn. Many advantages are claimed by this company for their machine. All of these are explained and illustrated in the bulletin, which is classified as TM-2. Included also are two pages of specifications for speeds of threading, based on such items as material and diameter of work. Another feature is a cut-away diagram showing the various parts of the machine.

#### AMMONIA HANDBOOK

The 1946 edition of "Ammonia in Metal Treating," a 40-page illustrated booklet, has been published by The Mathieson Alkali Works and is now available on request from the Company at 60 East 42nd St., New York 17, N. Y.

The booklet explains in detail the use

The booklet explains in detail the use of ammonia, either as a furnace atmosphere or as a source of pure hydrogen, in nitriding, dry cyaniding, bright annealing, copper brazing, powder metallurgy, atomic hydrogen arc welding and oxyhydrogen arc welding. Installations of these processes in metal working plants are described and illustrated.

The chemical and physical properties of ammonia and the general precautions to be observed in its safe handling and application are fully discussed.

#### MICRO-PLANER GAUGE

The Micro-Planer Gauge, a new inspection tool manufactured by the Accurate Mach. Prod. Co., 1640 S. Hobart Blvd., Los Angeles 6, Cal., offers master setting of measurements in thousandths of an inch. It is designed for setting cutting tools on planers and shapers, in conjunction with gauge blocks, and with sine bar in grinding angles, or as an indicator for transferring measurements. The gauge consists of a base and body

The gauge consists of a base and body with a thimble top. By turning the thimble counter-clockwise, the body rotates on ground micrometer 40 pitch threads. Range of the tool is ½" without extrusions and up to 2" with extrusions. In the thimble is a compensating adjustment for wear. A lock prevents tool from getting out of adjustment after correct setting.

# CUT COSTS WAYS! CARBOLOY DIAMOND WHEEL DRESSERS

and
GET MORE
UNIFORM
DRESSING,



#### CLUSTERS OF DIAMONDS!

Special Carboloy Cemented Carbide matrix diamondloaded from base to peak, holds particles securely. With many diamonds you get more uniform dressing. 3 Standard D.I.C. Dressers for fast dressing of a wide range of rough, semi-finish and finish grinding wheels.

#### LOWER INITIAL COST

Carboloy D.I.C. Dressers cut your initial costs, because they are priced about 50% below single-point dressers. And, they give you diamond-dressing at its best!

#### 2. LOWER MAINTENANCE COST

Single-point diamond dressers require frequent resetting—expensive, and time consuming. D.I.C. Dressers can be reconditioned in a few minutes in your own shop.

#### 3. REDUCED INVENTORY

No need to carry a stock of replacement dressers to "fill in" while others are out being re-set. D.I.C. Dressers require no re-setting.

### FOR BEST RESULTS WITH YOUR CARBOLOY CEMENTED CARBIDE WHEEL DRESSERS -

- Be sure to use correct traverse feed, to get maximum number of pieces, and to avoid wheel-glazing.
  (For Table of Correct Traverse Feeds, send for free Booklet DR-101).
- Avoid making too many passes without infeed.
- To avoid dressing taper, turn dresser one-quarter turn in holder.
- Reconditioning takes only a few minutes, and can be held to a minimum by making sure tool is mounted correctly and turned often.

CARBOLOY COMPANY, INC.

11139 E. 8 MILE BLVD. • DETROIT 32, MICH.

CARBOLOY



# for Better Belt Joints

To keep belts in service longer, use only GEN-UINE Clipper Belt Hooks applied with Clipper Belt Lacers.

# use Clipper Belt Hooks

Clipper Hooks are made of the finest quality wire— BETTER than ever before—produced for our exclusive use. Hooks hold with firm, sure grip — give longer satisfactory service.

# and Clipper Belt Lacers!

The Clipper No. 9 Portable
Lacer laces belts up to 6
inches wide in one quick,
easy operation. Under powerful pressure hook legs
are embedded flush with
the surface of the belt
and points clinched,
making a perfect joint.
Phone your mill supply
jobber for a demonstration!

CLIPPER BELT LACER COMPANY, Grand Rapids 2, Michigan, U.S.A.,



#### PEENING AND SCALING HAMMER



A new air-powered peening and scaling hammer, Model 7002, is announced by The Aro Equipment Corp., Bryan, Ohio. Usable for removing scale and rust on welded parts, it can also be used for removing sand on small castings and peening tubular rivets or other small parts.

This tool delivers 5,000 blows per minute, and it is said it will not distort light sheet metal when removing scale. Overall length of the hammer head is 2½" and the tool is 7" in length. The connection between hammer head and body can be any desired length. Body of the tool is of cast aluminum with built-in automatic throttle valve.

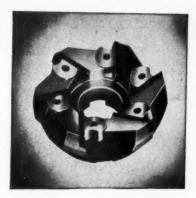
ROD SELECTOR CHART

Copy of a new Eutectic Rod Selector Chart has just been received.

This chart, in addition to listing the Company's products and their suggested applications, contains factual information which will be appreciated by all those doing welding.

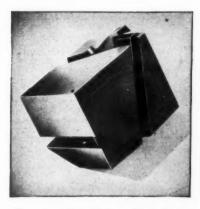
The bonding and remelting temperature is given for each alloy as well as the Brinell hardness. Another column features the strength in psi of these "Low Temperature" Welding Alloys.

Interested readers may secure copies of this 18" x 23" chart on request from Eutectic Welding Alloys Corp., 40 Worth St., New York 13, N. Y.



### CARBIDE BLADE FACE MILLS

Shown here are two illustrations from a circular issued by the Beaver Tool and Engineering Corp., 2850 Rochester R. 1, Royal Oak, Mich. The circular describes the Beaver Solid Carbide Blade Face Mill. As can be seen, this face mill has some details of construction which differ from conventional milling cutters. Blades are easily changed, resharpened and reset.



The other illustration is of a grinding block for sharpening the blades individually. This makes is unnecessary to sharpen the blades in place in the cutter body. Cutter and blade specifications for the use of these face mills are included.



### DIE HEADS

Automatically opens at a predetermined length of thread.

Instantly withdrawn from stock without reversing machine.

Instantly set from a rough cut to a finish cut of thread.

Button dies quickly changed.

Less set-up time. Low cost.

Accurate speedy thread cutting is assured with these DIE HEADS. A wide range of capacity of each size die head means a small investment, and makes this modern DIE HEAD the ideal general purpose thread cutting tool. For tough threading jobs where constant uninterrupted operations are essential, the BHICO DIE HEAD will do them.

No fussy adjustments to be made; Dies removed by loosening of two screws.

In ordering BHICO DIE HEADS, specify DIE HEAD size and diameter of shank.

Ask your Dealer or order direct.

Write For Details, Circular C-1

B-H INSTRUMENT CO.

3321-23 AVENUE S BROOKLYN 10, N.Y.





Get your copy of the Lovejoy L-R Flexible Coupling Catalog with the Quick-Finding Selector Charts. Shows at a glance RPM, Horse Power Rating, Bores, Type and Size of coupling to use. Weights and prices at hand. Handiest, quickest to use Coupling-finder Guide available. This predetermined engineering data will save you hours. Everyone interested in flexible couplings and power transmission should have this quide. Write Lovejoy

this guide. Write Lovejoy Flexible Coupling Com-pany today.

### LOVEJOY

Flexible Coupling Co. 5026 W. Lake Street CHICAGO 44, ILL.



### PIN POINT SOLDERING

With two power unit models and choice of 8 basic single or double carbon elec-trodes, the Luma Resistance Type Soldering Tool shown here will do almost any soldering job-from fine precision work to heavy industrial operations.



Four ranges of power units are offered: 2 single and 2 multi-stage. The 2 single stage tools have a range of from 1050 to stage tools have a range of from 1030 to 1225 watts. The 2 multi-stage, from 1575 to 2500 watts, Only the multi-stage is shown. It is equipped with a selector switch that gives instant temperature control at six different settings to suit the soldering job at hand.

Electrodes equipped with 5-foot extra flexible cables, range in size from 3/32" to ½" diameter. The 3/32" electrodes in both single and double types are es-

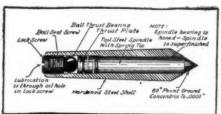
### BLUEPOINT - REVOLVING TIP LATHE CENTER

- Runs cool and yields under load to compen-sate for work expansion
- sate for work expansion
  Same dimensions as
  standard solid centers
  No more messy lubrication of work centers
  No more damaged center holes in work
- Accurate quality struction throughout
- Saves time-saves mon-cy-saves work

\$6.25

No. 2 Morse Taper Shank No. 3-\$7.75 No. 4-\$9.75 Morse Taper ASK YOUR

DEALER FOR DETAILS



**ERNEST** VANDERWALL 440 Golden Gate Ave., San Francisco 2, pecially adapted to light terminal work, manufacturing of jewelry, motor armatures, fuses, radios, microphones, har-nessed assemblies, etc. Weight including cable is only six ounces. Fibre glass insulation separates the tubes holding the carbons. For heavier operations, the 5/32" single and double carbon electrode is best suited. For spot soldering and work involving seams and large terminals, the %" and ½" single carbon or roller type is recommended.

This type of tool offers a definite savings in time because it requires no pre-heating period. A flip of the switch and it's ready for work. Operating current is in use only during actual operationwhen contact of electrode with job is made. Only a 10-watt energizing current

on light work where the small diameter electrodes are used, by attaching the required number of electrodes two or more operators may work from the same power unit with no differential in

time or quality of work.

All power units are fibre-glass insulated thruout, and may be used continuously. Boxed for delivery, the aluminum encased power unit, complete with cables and electrodes, has a shipping weight of 40 pounds.

Luma Units are supplied by Luma Electric Equipment Co., P. O. Box 132H,

Toledo 1, Ohio.

### AIRCO EXTRUDED COATING

A new extrusion coated self-hardening electrode is now available thru authorized Airco dealers from coast to coast.

Manufactured by the Stoody Co., this versatile electrode embraces excellent arc characteristics, working equally as well with either a-c or d-c. The new electrode is said to have many other advantages: 1—No slag interference;

2-Rapid deposition rate;

3—Can be applied in all positions;

4-No loss of hardness or wear resistance on multiple layers;

5-Solid, dense deposits with an absolute minimum of porosity; 6-Satisfactory application within a

wide range of amperages;

7—Easy slag removal while deposit is still red hot—slag is self-lifting when deposits cool;

8-Any desired type of bead can be applied including stringers, figure eights,

crescents, weaving beads, etc.

For additional information address your nearest Airco dealer or write to Air Reduction Sales Co., 60 East 42nd St., New York City 17.



Integral Drive Precision Bench Lathes. Double-taper headstock bearings of highest accuracy, or best precision preloaded ball bearings. Two good sizes 3/4" and 1". 30 Precision attachments available.



Open Cone Lathes worldknown. Four sizes, with compact under-bench Motor Drive Unit.



"ELECTROBLAST" High Speed Muffle Furnace, Two excellent small sizes.





Fig. 1—This special unit, which has a quadruple 29° Acme thread, is now threaded in a universal turret lathe with a series of five taps. Production has been tripled and scrap losses reduced over the old method of chasing the threads in a lathe with a single point tool.

### TAPPING QUADRUPLE THREADS

A new method of tapping the special bronze nut shown in Figure 1 has tripled production and greatly decreased the number of defective parts. The unit has a ¾" I.D., a 1.120 O.D., and is 1½" long; it has a quadruple 29° Acme thread, a 1" lead, and a ¼" pitch.

When the nut was first put into production an attempt was made to chase the threads on a lathe with a single point cutting tool. Because of the percentage of scrap, a series of five taps were developed to cut the thread.

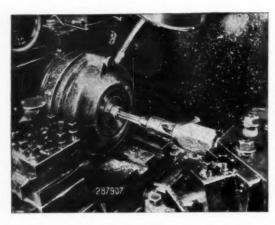


Fig. 2—One step in the tapping sequence; the shank of each tap is notched to aid the operator in selecting the correct tool in the series.

5000 SIZES Files SHAPES AND SWISS Files

### Ask for Catalog WF

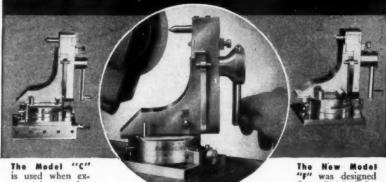
The most complete catalog of its kind. Lists 5000 different shapes, sizes and cuts of GROBET Precision Swiss Files. Ask also for catalog WM on files for filing

Learn more about these Chrome Steel Files that have won a reputation for utmost precision and durability.

GROBET FILE CO. OF AMERICA, 421 Canal St., N. Y. C.
PLANTS: NEW YORK • CHICAGO • LOS ANGELES

# "Thirdmotion" Series

OF RADII & ANGLE DRESSERS HAS A MODEL FOR MOST FORM DRESSING REQUIREMENTS



tremely precise depths of radii and simple operation are required. It is essentially the Model "E", with a special base which moves the "E" forwards and backwards by means of a hardened and ground lead-screw. The lead-screw handle graduated to .001" moves the "E" on a straight line with a sensitive range of a full inch.

The Standard Model PE" is universal for production and the tool-room. The basic design, also used in Models "C" and "F", makes the "Fluidmotion" Series among the finest dressing instruments procurable—regardless of cost.

With only one setting "Fluidmotion"\* blends two angles and a radius in one continuous motion that gives a clean form without tool or chatter marks. The Standard Model "E" is adaptable to both surface and cylindrical grinders.

Range of radii, concave or convex, 0 to 3". Angular travel, 2¼". Wheel capacity, 14". Height of diamond point from base, 7½".

for cylindrical, internal, and bench surface grinders with wheel diameters under 7". Its compact size is ideal for cylindrical grinders with spindle heights as low as 5" from table base. All Model "E" features are included. Range of radii, o to 11/2". Angular travel, 15/8". Wheel capacity at full range, 6". Diamond height,5".

### EXCLUSIVE "Fluid motion" FEATURES

- ★ .0001" accuracy
- \* Automatic centering
- \* "Fluidmotion" dressing
- \* 7" to 14" wheel capacities
- \* Dustproof and chatterless
- \* Large range—yet compact

\*REG. U. S. PAT. OFF.

\* Hardened stainless steel

WRITE FOR CATALOG



TOOL CO.

East Orange 2, New Jersey

Representatives in Principal Cities

As by the old method, the steps in making the nuts are cut off, drill, face and thread. Instead of chasing the threads in a lathe they are now tapped on a Universal turret lathe in five steps. To facilitate tapping, the threads on both the nut and screw are tapped to 3/4 of the full depth. The operator runs the taps into the nut and, as he removes each one from the chuck, he washes it with kero-sene oil to remove the chips. There are notches on the shanks of the taps to aid the operator in using them in the proper sequence. Figure 2 shows the op-

This same method has also been applied to a \%-\1/2 double thread monel nut that could not be chased successfully

with a single point tool.

By OTTO STARKE, Factory Service Division, Westinghouse Electric Corp., East Pittsburgh, Pa.

### HANDBOOK ON HACKSAWS

A handbook is now available which is of particular importance to operators of hack saw machines, hand hacksaw blades, and metal cutting bandsaw blades. It is primarily intended for the man at the

machine, or the men at the bench who use the hand blades.

Many hints on the use of blades are given in this 50 page book. This book ex-plains why teeth break, why pin holes break, why body of blade breaks in middle, why teeth get round, and why a cut is crooked. The way to correct these faults are explained and illustrated. Many useful charts and specifications make this a handy reference book.

The Capewell Manufacturing Co., Hart-

ford 2, Conn., will be glad to send a copy to anyone who is interested in this type

of material.

MID-WEST ABRASIVE CATALOG "Mid-West Dependable Abrasives", a 32-page catalog designed for the average hardware salesman and jobber, as well as for the top purchasing executive and en-gineer. In addition to descriptive illustrations of coated abrasives, grinding wheels, honing and sharpening stones, and many abrasive specialties, it contains complete cross-indexes showing the various sizes, weights, textures, and corresponding unit prices. Beautifully compiled, and one of the most comprehensive catalogs in its field, it may be obtained by writing the Mid-West Abrasive Co., Owosso, Mich.



Comparison quickly demonstrates such Air-O-chek advantages as leak-

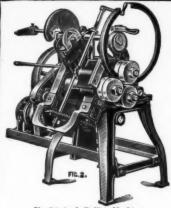
That's why four out of five plants adopt Air-O-chek Air Guns as standard after a comprehensive test.

Try it. Install a dozen Air-O-cheks and compare results with the best you ever had.

Prompt delivery on high priority. Sizes for all requirements. Catalog on request.

AIR-WAY PUMP & EQUIPMENT COMPANY, 411 S. Jefferson St., Chicago 7, III.

Note double grip af-



No. 14 Angle Rolling Machine

ROLLS ANGLES, TEE IRON, PIPE, FLATS, ROUNDS AND SQUARES CAPACITY—2'x2'x4' ANGLE

Machine

that has found its way into
40 States

used by Manufacturers of

SHIPS-PLANES-TANKS-AUTOMO-BILES-ENGINES-FURNACES-FARM MACHINES AND METAL PRODUCTS OF ALL KINDS

also by

U.S. ARMY—U.S. NAVY—N.Y.A. UNIVERSITIES

· · · There's a Reason!

EXCELSIOR TOOL & MACHINE CO. EAST ST. LOUIS, ILLINOIS



# **FAST, ACCURATE SPACING**

Graduated in thousandths, you have plus or minus .0005" at your fingertips with

DAYTON ROGERS ADJUSTABLE
SPACING COLLARS

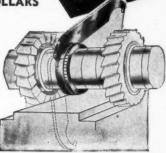
You can make an accurate, positive adjustment just by loosening the cutter arbor nut and making adjustment as illustrated.

Made in 12 standards for cutter arbors from 7/8" to 2". Write for illustrated Bulletin 120-7.

DAYTON ROGERS MFG. CO. 2849 12TH AVE. SO., MINNEAPOLIS 7, MINN.



GANG MILLING SET-UPS



### ALL-PURPOSE GRINDING WHEEL

Until now, an all-purpose grinding wheel has been considered as something of a dream. But now the DoAll Co., Minneapolis, Minn., announces a new DoAll All-Purpose Grinding Wheel for distribution by its 37 domestic sales and service stores and 59 foreign representatives.

It is asserted that the DoAll Wheel will grind any kind of material; hardened alloy tool steel, annealled steel, stainless, Monel, bronze, aluminum, brass, hard plastics. That the wheel works equally well for heavy fast roughing cuts and fine finishing and produces a precision finish comparable to that of a 300 grit wheel. It can be used on all types of grinding machines—surface grinders, centerless, cylindrical, tool grinders,

ers, centerless, cylindrical, tool grinders, pedestal. No alteration to the machine is necessary and the cutting rate is limited only by the ability of the grinding ma-

chine.

It is claimed that because of the unique cutting crystals and method of bonding used in the DoAll Wheel, heavier cuts



without sacrifice of surface finish or accuracy can be taken. Production three to 10 times faster than with conventional wheels may be obtained. The effective cutting edges of the crystals are broken down at a very slow rate resulting in longer life to the wheel and requiring dressing at much less frequent intervals. The structure is such that loading even when grinding soft materials is reduced to a minimum.

The bond used in making these wheels is said to be insoluble which prevents them from weakening from use of coolants in wet grinding. On the other hand the open structure is such that the work remains cool even when dry grinding.

These wheels are available in Types No. 1 (straight), No. 5 (recessed one side) and No. 7 (recessed two sides). Sizes range from 1" to 14" in diameter by ¼" to 3" in thickness. Any size arbor hole is available. Each wheel is packed in an individual corrugated cardboard box for ease of handling and protection in storage.

### STEEL CATALOG-HAND-BOOK

The extensive new steel catalog and hand-book announced by Bissett, contains much helpful information for the steel buyer, engineer and production man.

The complete catalog will contain seven separate sections covering Cold Finished Carbon Bars, Cold Finished and Hot Rolled Alloy Bars, Turned and Ground Shafting, Tool Steels (Including Tool Steel Tubing), Drill Rods, Spring and Shim Steel and The Bisco Data Book.

# New! Simple! Versatile! NILCAMP DRILL PRESS FEED



### Air Operated

Hydraulically Checked.

Convert Your Own Drill Press Into a Sensitive & Automatic PRODUC-TION TOOL!

Can Be Run Without Operator

Write today for details.
C & N Mfg. Co., Saybrook, Conn.

Dealers Inquiries Invited

324

Hardenability charts, data on chemical content and grain size are examples of the useful and essential information the new book contains. Three sections have already been published, the others are in production and when completed, the set will be assembled in an attractive binder.

Headquarters of the Bissett Steel Co., are located at 945 East 67th St., Cleveland, Ohio, with sales agents in principal cities.

### HI-BOND GAGGER BARS

Hi-Bond reinforcing bars, introduced about two years ago and said to mark the first real improvement in the bonding value of concrete reinforcing steel in more than 30 years, have also been found ideally suited for foundry gagger bar applications, according to a recent report.

The special design of Hi-Bond, which consists of double reverse helical ribs between horizontal ribs, provides maximum mechanical grip as well as the greatest bonding surface for a given section of gagger bar, it is said. The report further states that sand may be packed more firmly and evenly around each gagger, holding the mold together more securely.

Compared with twisted squares, it is said that Hi-Bond bars are easier to handle, and more readily formed, straightened and re-formed. The cost is considerably less, it is reported.

A bulletin describing in detail this new type of gagger bar may be obtained by writing to Joseph T. Ryerson & Son, Inc., P. O. Box 8000-A, Chicago 80, Ill.

### PRODUCTS BY IDEAL

A 24 page bulletin of products resulting from 30 years of service has been published by the Ideal Industries, Inc., 1296 Park Ave., Sycamore, Ill. This company was formerly known as the Ideal Commutator Dresser Co. Specifications and illustrations accompany all products. Ideal produces many air and electrically powered products.

The products, listed in the order of their presentation are: The Ideal Etcher, Pneumatic Drill, Pneumatic Screwdriver, Rotary File, Oil Grinder, Pneumatic Riveting Hammer, Pneumatic Tool Accessories, Dust Collector, "Multi-Duty" Line Center, Balancing Ways, Universal and Independent Chucks, Portable Demagnetizers, Granite Surface Plate, Grinding Wheel Dresser, "a-c" Magnetic Chuck, and Electric Tachometers. The bulletin should prove a good source of reference for Ideal Products.



Six handy tools combined in a compact little-giant of a wrench that alips easily in your coveralls pocket. Gives a tight, slip-free grip of more than a ton pressure on any piece you can get hold of. Exclusive toggle arrangement applies gripping power uniformly over entire jaw surface...right to the very tip. Releases with a flick of the finger. Hundreds of uses in shop, garage, home or farm. Look for it today:

NOW. a Huskier Model

Large, powerful, designed for heavy service, the new No. 11 is 11" long, has a 1½" maximum jaw opening, and wields a 1½ ton grip. On sale at leading hardware, auto equipment, electrical, plumbing and mill supply stores.

Three popular sizes:
No. 7-Max, jaw opening 34...-Price \$2.45
No. 9-Max, jaw opening 1
No. 11-Max, jaw opening 1
2".--Price \$4.60

BMC MANUFACTURING CORP.

### SOLENOID STARTER



To meet the demand for a larger starter with the solenoid switch structure, Allen-Bradley Co., 1311 S. First St., Milwaukee, Wis., has developed the Size 5, Bulletin 709 solenoid starter. This new unit, which has a maximum horsepower rating of 100 hp, 220 volts and 200 hp, 440-550-600 volts, will replace the older Allen-Bradley clapper starter.

By employing the solenoid design, the size of the starter has been greatly reduced compared with that of the clapper-type starter which it replaces. The enclosed starter is available in the NEMA Type I sheet metal enclosure for general purpose applications, as well as the Type 4, water-tight and weatherproof; Type 5, for nonhazardous dust.

### SPIRAL TUBE BULLETIN

Taking economy as its theme and citing laboratory test data, a new booklet describes and illustrates uses for a spirally formed, lightweight tubing.

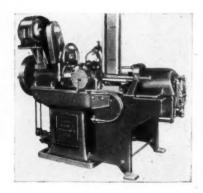
A four-ply "backbone" construction makes tubing sufficiently rigid for use as stacks, stack-liners, and flues. It is cheap enough to be used as forms for concrete pillars, posts, and piers, as well as for shipping containers. One man can carry 60 feet of the tubing in 20-foot lengths.

Copies of the Bulletin, entitled "Big New Economies for Pipe and Tubing Users," are available from Pratt Industries, Inc., Frankfort, N. Y.

### AUTOMATIC NIPPLE MACHINE

The Landis Automatic Nipple Machine developed by the Landis Machine Co., Waynesboro, Pa., threads, reams, and chamfers both ends of space nipples automatically. The machines are built in two sizes; the 11/4" machine, and the 2" machine.

The 1½" machine can be equipped to handle any one diameter of pipe, or, if required, combination equipment can be furnished for both ½" and ¾" pipe sizes. Combination equipment for 1" pipe size cannot be furnished. Nipples ranging from 2" to 6" lengths can be machined on ½" and ¾" pipe sizes and 2½" to 6" lengths on 1" pipe size.



The 2" machine can be equipped to handle any one diameter of pipe, or, if required, combination equipment can be supplied to take 1" and 1½" pipe sizes and 1½" and 2" pipe sizes. Other combinations of pipe sizes can not be furnished. The lengths of nipple handled are from 2½" to 6" on 1" and 3" to 6" on 1¼" to 2" sizes.

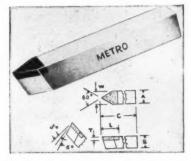
#### VISUAL AID

New literature describing the use of Super Sight—Headloupe Model 502 in industries and professions where depth perception (third dimension) together with good magnification are vital has been released by The Boyer-Campbell Co., Safety Division, 6540 St. Antoine, Detroit 2, Mich.

Number 502 Headloupe is made in two powers, 134 diopters, 13" focal range, and 21½ diopters, 9" focal range. These can be worn with or without glasses.

### METRO THREADING TOOLS

A new line of Standard Carbide Tipped Threading Tools, Style M-15, is announced by Metro Tool & Gage Co., 4240 W. Peterson Ave., Chicago 30, Ill. These tools are of the 60° V-nose type. Primary



clearance at nose is 3°, with a secondary clearance of 6°.

According to the manufacturer, these tips are made of a tough, wear-resistant grade of carbide particularly suitable for long run threading of steel parts.

### NINE-SPEED UNI-DRIVE

A nine-speed selective sliding gear transmission—more than twice as versatile as before . . . is featured in the new Turner Uni-Drive, now in production. Also available is a new six speed transmission, and the established line of three and four speed transmissions.

Thoroly tested, the new Uni-Drive models are the result of years of design and production experience. Precision-cut, heat treated gears are mounted on nickel steel shafts . . . run in a bath of oil. The streamlined case is of lightweight cast aluminum.

Designed for power units from ½ to 20 horsepower, these latest Turner transmissions can be used on lathes, turret lathes, milling machines, shapers, boring mills, hand screw machines and other motorized machine equipment. Standard mounting brackets make installation quick and simple on a variety of machine tools and industrial applications.

Advantages of previous Uni-Drive models are retained in the six and nine speed transmissions. There are no belts



to shift. No overhead line and counter shafts are necessary. Each unit functions

independently.

New standard and special single-speed reduction units for industrial applications are also being produced, according to officials of the Turner Machinery Co., 3416 Terrace St., Kansas City, Missouri.

### COLLET-TYPE SCREW FINDER

A new Jackson Collet-Type Screw Finder for electric and pneumatic screw drivers starts and completely sets screws in a single operation. It is claimed that accurate time studies show savings of 47% and up as contrasted with starting and final setting of screws by hand.

The finder, which is attached to the screw driver, holds the screw firmly and works in any position and in places not easily accessible to other tools or to the fingers. One hand is left free for posi-

tioning work.

According to the makers, the finder is non-rotating and close-fitting to prevent bit from whipping. The bit is guarded and no impression is left on the screw head or on the work surrounding the screw. Models are available for all standard types and sizes of machine and wood screws.



The Jackson Collet-Type Finder is manufactured to specifications for James Industries, Inc. by Hardinge Bros., Inc., Elmira, N. Y. For further information, write James Industries, Inc., 228 Municipal Bldg., Skaneateles, N. Y.

### CATALOG FOR PROFILOMETER

The wide range of use of the Profilometer is explained in the 1946 catalog available from the Physicists Research Co., Ann Arbor, Mich. This type of equipment should prove of great value where control of surface finish is necessary. The operation and principles are explained and many reasons for its use are set forth.

Various types of tracers are available for measurements on flat surfaces, surfaces on inside diameters, gear teeth, rounded objects, grooves, and other

places.

### SINGLE BUTTON STARTERS

The Master Electric Co., Dayton, Ohio, announces a new product, A-C Across-the-Line Motor Starters featuring a single push button for starting and stopping squirrel cage motors.



These starters are of the sciencid type with vertical straight line motion, and use bridging type contacts. The single button feature together with "on", "off," indicating flag simplifies the starting and stopping operations by eliminating one push button. The single push button is furnished in starters where the control is located in the cover, as well as in remote control stations. One single button remote control station can be used with a starter of any voltage 110 to 550 or frequency 25 to 60 cycles. This is ac-complished by bringing a tap off the starter solenoid coil at a point that will maintain a constant number of ampere turns on the remote station magnet coil. With starters having the push button located in the cover the mechanism is the same as in the remote station except that no holding magnet is required. This function is performed by the armature of the solenoid. For applications where multiple remote control of a single starter is required the conventional two button station is available.

### GRINDING WHEEL DRESSER

The new Samson Grinding Wheel Dresser, with its forced-feed lubrication, is sturdy, accurate and will dress and true any wheel now being dressed by other dressers including many previously dependent on diamonds.

Grit, which soon destroys regular dressers, cannot get into this new tool, according to the manufacturer, because bearings and cutters are completely sealed in pressure-fed grease. The pressure of the grease prevents grit from feeding back into the dresser.

A new folder, with illustrations and descriptive material, is now available from the G. J. Wallen Manufacturing Co., 617 Bryant St., San Francisco 7. Calif.

### MIDGET HYDRAULIC MOTOR

Production of a new type of industrial hydraulic motor, combining high starting torque with turbine-smooth power, has been announced by Superdraulic Corp., Dearborn, Mich. This development, known as the Superdraulic Triport Motor, parallels the Superdraulic line of high pressure hydraulic pumps, making available a belanced combination of pumps and motors, each designed to insure efficient operation when combined as complete power transmission systems.

Compactness of the new motor makes direct drive available for many machines which have had to forego this modern type of power application because either electric motors or hydraulic motors necessary to meet power requirements were too large and bulky to be built into the machines. In the case of Hyper-Milling, for example, a serious problem has been to provide sufficient driving power for the spindles.

According to James Hoffer, Superdraulic chief engineer, this is the first time in the history of hydraulic devices that ample power for most machine applications has been available from so compact a unit—the 47 hp motor is only 10½" in diameter and light enough to be easily



handled by one man. The motor is available in two types, one rated at 26½ gpm with 3,500 psi, input at 1,200 rpm; the other at 19 gpm with 5,000 psi at 1,200 rpm.

The new motor is said to hold many advantages for industrial machine applications, including infinitely variable speed control, forward and reverse, by means of a convenient finger volume control valve; starting without clutches; and perfect control of acceleration and



deceleration. Because of its unique design, which provides 66 power strokes per revolution, the motor is said to have turbine smoothness.

Another difficult problem solved by the Superdraulic motor, is application of power in plants where other types of power may represent a fire hazard. In explosives factories, magnesium fabricating plants, and in mills where a high dust content in the atmosphere represents a constant danger, hydraulic power offers a simple solution. Hydraulic pressure generated by Superdraulic pumps, located outside the danger area, is readily transferred by means of tubing to the hydraulic motors mounted as direct drive units.

### HYDROMATIC MILLING MACHINES

The Cincinnati Milling Machine Co., Cincinnati, O. announces a line of new Hydromatic Milling Machines. The machines are of bed-type construction, with automatic table feed cycles, and variable table feeds. Machines are built in plain and duplex styles, and in 12 sizes, ranging from  $7\frac{12}{2}$  to 30 hp with table traverse from 24" to 90". More powerful motors

can be attached for special application. The machines are heavier, and the table is wider. The ways are square gibbed. The entire transmission including the pick-off gears are spiral, bevel, or helical.



An innovation is found in the vibration damper construction of the overarm. This casting is much heavier than before, has a built-in unit which arrests vibration at the outboard end of the arbor, reducing the need for supplementary support through the arbor support braces.



A choice of seven ranges of spindle speeds are available. The highest is from 164 to 1225 rpm for small spindle carriers, 137 to 1000 rpm for medium, and 110 to 820 rpm for large spindle carriers. Eight speeds are available within each range.

Electrical controls are built into a compartment in the right-hand headstock. Also built in are several electrical safety features. Coolant equipment incorporates a three-way switch, offering the operator a selection on continuous flow or automatic start and stop with the spindle rotation.

Hydraulies do the work of starting and stopping the spindle rotation. A small start-stop lever, located in the manual control group, releases the hydraulic pressure which engages and disengages the spindle drive clutch. This arrangement relieves the operator of much manual labor. Also included in the control lever group are the four position table control lever (rapid traverse and feed right and left), the table stop, and automatic spindle stop. Leveling jacks are built into the base. These will aid materially in maintaining alignment, especially on long bed or duplex style machines.

With the exception of four minor oil



cups (eight on duplex machines) lubrication is completely automatic. Spindle carrier parts are lubricated by a circulating system from a pump and reservoir within the unit.

A more thoro description may be found in publication No. M-1372.

### COLLET INDEXING FIGURE

Originality of design is said to be an outstanding characteristic of the new



collet indexing fixture announced by G & H Mfg. Co., 327 Elm St., Fitchburg, Mass. Constructed to hold work for milling, grinding, drilling, and shaper operations, this new fixture is claimed to be of special advantage where accuracy of work location, and convenience of loading and unloading work are important factors. The fixture can be positioned either horizontally or vertically on machine work table with equal facility.



Fixture viewed to show chip clearance hole extending thruout fixture's depth, Lever at right operates indexing pin.

According to the makers, exceptional accuracy of work location is achieved,



Side view showing open bottom section for easy chip removal. Covered section at left contains extra screw insert stop buttons.

as G & H fixture design prevents movement of work, once it is gripped in collet. Stock does not change position during collet closing action, and this is especially important when length tolerances are close.

Removable screw-insert stop buttons are used to block out unwanted indexing stations in a particular set-up. The index plates are likewise removable. A selected position is quickly and easily introduced, or an undesired station blocked out of indexing sequence merely by removing or inserting a screw in the indexing plate



slot. A chip clearance hole extends thru entire depth of the fixture for the purpose of offering a ready exit for chips, and prevent them from clogging working parts in the fixture. The fixture's bottom section is of open construction, and this allows chips to be removed quickly, as they fall thru onto the work table. Chips likewise roll off fixture without interference, as it has been designed without projections or ledges which can form traps for chip accumulation.

Collets commonly used in B & S automatics and wire feed screw machines are often specified for the G & H indexing fixture, but other types of draw-in and push-out collets can be used when desired, providing fixture is equipped with

the correct closing piece.

Additional information, complete specifications, and descriptive sales literature may be obtained by writing manufacturer on your business letterhead.

### MILLING MACHINE MOVIE

W. H. Nichols & Sons announce a new 16 mm color sound movie entitled "The Miller That Uses Its Head." Unlike many technical films, this is not a "how-to-operate" film, but is an analysis of the Nichols Hand Miller from the tool engineer's and tool designer's points of view.

The film runs for 23 minutes. It shows many different kinds of tooling and fixture design, all the way from simple stock fixtures to completely automatic fixtures, such as one for planing a double-start helix on a fuel injector plunger.

This is one of the first films to deal directly with tool and fixture design.

Inquiries for showings of this new film should be addressed to Nichols-Morris Corp., 50 Church St., New York City.

#### AIR CYLINDERS

Air cylinders are fully described in a new catalog issued by the Hanna Engineering Works, 1765 Elston Ave., Chicago 22, Ill. This catalog is identified as No. 234 and gives complete specifications and operating data. This should prove useful to engineers and production men in the selection of cylinders. This company produces both hydraulic and pneumatic equipment. These cylinders supply power in hundreds of ways, to push, pull, lift, press, raise, lower, clamp and control.



# you'll need

Reliable production control means profitable operation . . . and with Productimeters installed on your machines you always have accurate production figures . . . no guesswork about it. Use these figures in a variety of ways . . . for time study, basing costs, machine maintenance and servicing.

Model 5-H-1-1-R, above, is a heavy duty stroke style, designed for use on punch presses, screw machines, drill presses, shears, turret lathes, and similar applications. For complete details

### Send for Catalog No. 7

Or, write us about your problem. Our recommendations are backed by 67 years' experience in the manufacture of counting devices.

### DURANT MFG. COMPANY

1928 N. Buffum St.

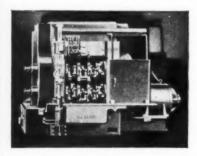
128 Orange St.

Milwaukee 1, PRODUCTIMETERS Providence 3, Wis. | THE SPEEDOMETERS OF INDUSTRY | R. I.

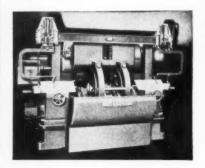
### AUTOMATIC CRANKSHAFT LATHES

Production of automatic crankshaft lathes by the R. K. LeBlond Machine Tool Co., Cincinnati, Ohio has been resumed.

LeBlond's new line of automatic crankshaft lathes consists of: 6AC—for rough or finish turning all pin bearings. 7ACL rough turning all line bearings. ILB combines rough and finish turning of line bearings. DM—finish turning of line bearings.



6AC—2-spindle machine, built for simultaneously rough turning or finish turning pin bearings on both spindles. Average production claimed is 30 to 50 cranks per hour.

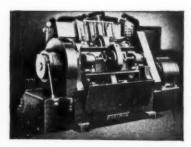


7ACL—single or double center drive for rough turning all line bearings in one operation. Average production claimed is 15 to 25 cranks per hour.



1 LB—single spindle, either single or double center drive lathe, with separate sets of tool units for simultaneously rough and finish turning all line bearings, flange and stub ends of crankshafts.

Finishing tool unit provides positive, smooth dwell of pre-determined duration for sizing the work, contains coolant system, and acts as chip guard and apron for protection of operator. Average production claimed is 12 to 20 cranks per hour.



DM—Four-station indexing machine built on the revolving drum principle for finish turning of line bearings. Completely eliminates all rough grinding operations. The addition of the fourth station—loading station—makes continuous operation of the machine possible.

Although there is some small overlapping of functions, these four machines represent a well rounded line of automatic crankshaft lathes that perform all turning operations, such as, rough and finish turning, filleting, cheeking, and shaving.

WOODS BELT SANDER An interesting Model 40 Belt Sander is offered by Woods Engineering Co., Norwalk, Conn.



It can be operated either vertically or horizontally, thereby performing double duty and assuring maximum production.

With the small positional platen, this versatile machine is quickly adaptable to grinding operations of many kinds as well as sanding operations of many kinds

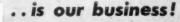
within its capacity.

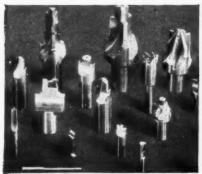
The Model 40 is a precision built machine thruout. It embodies heavy duty New Departure dust sealed ball bearings, reversible platens and continual flat work surfaces. Adjustment of tension and Belt Tracking is accomplished with simple thumb screws. Additional infor-mation available from the manufacturer.

### GARDNER-DENVER HISTORY

Gardner-Denver Co., Quincy, Ill., have issued a most interesting book describ-ing the background of the Company, the manufacturing and distribution of its products to the markets of the world and world War 2. Unlike most pieces of literature of this type, this book is unrelated to actual sale of anything but does show the worthwhile job this Company is doing in many fields in many parts of the world. It makes very interesting reading and is well illustrated.

# FORM-GRINDING





· Your own products are your specialty. Why not let us form-grind the illustrated types of form flat-drills in which we specialize?

Our entire organization is keenly interested in "Form-Grinding" and its problems. Facilities include J. & S. "Form-Dressers," J. & S. "Form-Grinders," and all necessary form-grinding equipment. The "knowhow" developed by supplying some of the outstanding nanufacturers in industry, is available for your quality tool requirements-and at competitive prices. Your requests for quotation are solicited on that basis.

Write for booklet or send prints today!

TOOL CO. 477 Main St., East Orange 2, N. J.

utacturers of "Pluidmolian" Rudii and Angle Drasiers

### BLUE POINT LATHE CENTERS

Blue Point revolving tip lathe centers present several unusual and interesting features.

First of all, these centers are of the same dimensions as standard sold centers, there are no bulky heads to get in the way.

An ingenious method of compensation for work expansion is embodied in the center. This enables the center to adjust itself automatically as the work expands due to heat. The makers emphasize that it is not necessary to adjust the tailstock.

Another interesting claim is that the Blue Point gets away from messy lubrication of work centers and that it eliminates damaged center holes in the

vork.

The compensating feature is simple. The hardened alloy steel spindle revolves in a hard steel shell and thrust is taken up by a replaceable steel ball and thrust plate. The slotted spring tempered end of the spindle permits a slight yielding of the tip under load and expansion due to heating of the work, absorbing shock and maintaining even pressure.

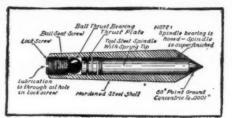
Further details are available from Ernest H. Vanderwall Co., 440 Golden Gate

Ave., San Francisco 2, Cal.



A new core-plate enamel tester designed for measuring insulating value of





enamel coating on sheet steel or steel punchings has been announced by G E. Consisting of a test head, hydraulic press and control unit, the tester provides a standard for measuring the insulating quality of enamels. The new instrument is especially useful for testing rotor cores as it simulates the conditions of heating and pressure which may exist in a core.

and pressure which may exist in a core. The core-plate enamel test head has 10 insulated brass contact buttons backed by spiral springs which give independent pressures of from 500 to 750 lbs psi. These are mounted beneath a steel base upon which two ½" twist drills are located. The test head itself is mounted on the upper plate of a "C"-shaped hydraulic press, and a heater is mounted on lower plate of press. Control unit is the source of power, and contains the indicator for enamel resistance measurement. The jack has a capacity of 20,000 lbs and the heater has a maximum temperature rating of 300 C.

To operate, the heater is first brought up to the desired temperature and test specimen is placed upon it and allowed to stand for about a half minute. Then the hydraulic press is pumped until the required pressure value is obtained. The press forces the enameled specimen against the 10 contact buttons of the test head, compressing the springs and forcing the two drills into the specimen. Thus, a closed circuit is formed with the current passing thru the contacts and enamel to the core metal and back thru the drills to the power supply. The control unit is then switched on and adjusted to 1/2 volt across the enamel coating. Good insulating properties are indicated by a low current reading on the ammeter. A direct short circuit or no insulation would give a reading of one ampere.

# Anderson BALANCING WAYS

Shops handling rotating parts find this simple, sturdy and thoroughly dependable device highly efficient for balancing and truing operations. It assures better work . . . saves time . . . saves labor. No leveling required.

Four chilled iron discs rotate with minimum friction on sensitive special bearings, giving  $\alpha$  quick, accurate indication of whether or not the work is in perfect balance.

Swing	Greatest Distance Between Standards	Capacity in lbs.
20 in.	20 in.	1,000
40 in.	30 in.	2,000
60 in.	30 in.	2,000
72 in.	66 in.	5,000
96 in.	88 in.	10,000







Send for BULLETIN 9-5

# CUT ANY SHAPE BETTER with BEVERLY Throatless SHEARS



The No. B-3 BEVERLY Bench Type Shear with Ball Bearing Hold Down handles 3/16" or No. 10 gauge stainless steel. This sturdy shear weighs 58 lbs. and is equipped with H. C. H. C. Blades for heavy duty service.

Let us send Bulletins giving full details on the BEVERLY LINE -

THE BEVERLY SHEAR MFG. CO., 3005 W. 110th Pl., Chicago 43, III.

### HARDINGE PRECISION SECOND OPERATION MACHINE

Another new machine is announced by Har-dinge Brothers, Inc., El-mira, N. Y., viz., a new model DSM59 High Speed Precision Second Operation Machine designed for modern high speed production departments working to extremely close tolerances and finish specifications,

The new machine incorporates all the features of their second operation machine line, and in addition:

The steel bed ways are of the new improved dovetail design. These These ways are ground to master gages after hardening to assure sustained accuracy and precision interchangeability of attachments.

The bed has a three point mounting on the welded steel pedestal

base. This assures or-iginal bed accuracy even when machine is placed on an uneven floor.

The fully enclosed headstock has a preloaded ball bearing spindle construction. Spindle is ground to take standard 1" capacity 5C Hardinge Collets and 6" capacity step chucks. Spindle nose is supplied with either the Hardinge standard taper nose or Hardinge standard threaded nose for direct application of step chuck closers, jaw chucks and face plates. Headstock spindle is driven by a "center-drive" belt. Center-drive construction places belt between the spindle bearings for balanced bearing spread and equal distribution of belt pull. The center-drive belt is easily replaceable without remov-ing any part of machine.

The collet closer for instantly closing and opening collets or step chucks is ball bearing connected to the operating lever for ease in operation-when the spindle is at rest or any of the operating

speeds to 4000 rpm.

The rugged double tool cross slide has a constant full bearing on base to assure rigidity and sustained accuracy when taking heavy forming cuts. Cross slide tool post takes standard %" square tool bits. When desired, regular tool posts can be removed and number 00 circular form tools and holders applied to cross slide.



A straight or taper turning slide can be applied for turning or boring straight or

angular surfaces.

Turret head is mounted on preloaded ball bearings eliminating play between turret head and turret slide. To eliminate radial play between turret head and turret slide, turret head index pin is mounted on preloaded roller bearings. The combination of the preloaded ball bearing turret head mounting and preloaded rol-ler bearing index pin is claimed to provide a new accuracy for turret work. Head is bored to take standard %" shank tools.

Coolant facilities are provided as stand-

ard equipment.

The welded steel pedestal base fully encloses driving unit and tool storage compartment. Front of pedestal is arranged for adequate knee and leg room. An adjustable foot rest is provided.

Electrical equipment is a built-in part of the machine, providing magnetic con-trol with time lag thermal overload relays and low voltage protection. A transformer provides 110 volt current for the push button control current.

Machine has Hardinge pre-war finish and is shipped with motor and wiring complete ready for immediate operation

after connection to power line.

# Machine Tool Tables

INTENDED PRIMARILY FOR USE ON RADIAL

DRILL WORK

Parts to be drilled can easily be fastened to these tables and the job quickly done at a comfortable working height.

Made in 2 sizes:

20x20x36 - Weight 1100 lbs.

20x12x24 - Weight 615 lbs.

For further details and prices WRITE\_

THE WATSON MACHINE CO. 74 Railroad Avenue

Paterson 3, N. J.



# AP BREAKAGE Reduced

Square, Straight Tapping in Half the Time

The Dahlstrom Tap Guide practically elimingtes tap breakage and saves wasted hours getting broken taps out of expensive dies. It does the job in a jiffy with work always straight and true. Just fasten it to a post or bench, slip a Tap Adaptor into the spindle, and even an inexperienced operator can handle it. Equipped with 7 Adaptors, ranging from 8-32 to ½". Taps not furnished. Ask your mill supply house, or \$42.50 F.O.B. Minneapolis.

Literature on request.

Dahlstrom Manufacturing Co. 416 South Sixth Street, Minneapolis 15, Minn.



ahlstrom TAP GUIDE

### KRW LIGHT-WEIGHT BLANKING AND FORMING PRESS

One of the sound developments to come out of war technology was the trend toward lighter and more efficient machine tool equipment. Proof of this can be found in the new KRW 80-Ton Blanking and Forming Press. These new KRW Presses consequently can be built and delivered in a matter of weeks. They can be built with open or closed ends and with greater or less capacity than the one illustrated.

This new 80-Ton KRW Press was designed for blanking, stamping and forming sheet metal parts, cutting cloth, rubber, asbestos and similar materials with steel rule dies. It is also adaptable to compression moulding of rubber, plas-

tic or ceramics.

Two heavy duty hydraulic cylinders develop controlled pressure to perform the work. Pressure is equalized between the cylinders by an exclusive KRW mechanical linkage and torque bar arrangement. This linkage assures equal travel of each ram with no thrust load placed on the rams or packings. Pump equipment is optional,

and can be furnished to suit the customer's requirements. The press frame is a weldment. Any of its dimensions may be altered to suit your particular require-

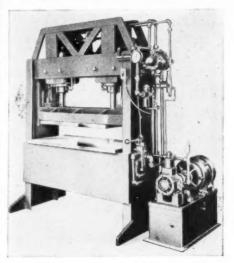
ments.

While the platen travel is slower than that of a flywheel press, it has been found from experience that greater production speed is achieved because a much shorter stroke is practical. An adjustable, automatic stop can be provided to regulate length of stroke.

Longer die life is assured because the press utilizes steady hydraulic pressure as compared with the jarring impact load produced by conventional flywheel press-es. There is no danger of the press being jammed due to careless operation. The platen may be stopped and reversed at any point in its travel. Furthermore, there are no wheels to stop on dead center. The maintenance problem is simply one of maintaining proper oil level in the reservoir. All parts of the hydraulic system are self-lubricating.

KENNAMETAL GROOVING-TOOL

Kennametal Inc., Latrobe, Pa. is now producing a line of solid Kennametal grooving-tool blades, said to permit many more regrinds than tools having brazedon tips. An outstanding feature of these



new blades is their rigidity, a characterrepaired blades is their rigidity, a characteristic that minimizes "weaving", which apparently has been a major cause of rapid tool wear on grooving jobs. Pre-liminary service results on production runs are reported to have demonstrated that solid Kennametal blades have grooved 18,000 to 20,000 aluminum alloy pistons before regrinding, whereas the brazed-on tools formerly used had to be reground after cutting grooves in approximately 800 pistons. Kennametal grooving-tool blades can be supplied in sizes to suit users' requirements. Standard sizes now available include \( \frac{1}{2}'' \) high x 2\( \frac{1}{2}'' \) long, and \( \frac{3}{2}'' \) high x 4" long. They are supplied with 10" angle formed on one end, 2° clearance angles on each side, and in widths made to users' specifications, plus or minus .0005".



### THE NEW DEARBORN MODEL "E" CHUCKING

### AND INDEXING FIXTURES



Dearborn fixtures meet every demand for automatic chucking and indexing, permitting several operations on the same piece with only one setting.

Model E is both a degree and a ratchet indexing fixture. It may be changed from one to the other in less than a minute. It will index any number of degrees or any fraction of a degree. Two adjustable stops

are provided so that two angles can be obtained if necessary.

Work is held by collets which take up to and including 1" round, %" hexagon and 34" square. Other shapes can be held with special collets.

Let us send bulletin giving full information.

### J. W. DEARBORN

ANSONIA, CONN., U.S.A.

# A USEFUL ADDITION

Modern precision machine shops and inspection departments will find this sturdy 36°x 48° MILWAUKEE SURFACE PLATE a valuable addition. Constructed of semi-steel, accurately machined, securely mounted on cast legs which are machined and provided with SAE adjusting screws for perfect alignment. Height from floor to top of plate 30°. Can also be had in 38°. Shipping weight 1200 lbs.

We also manufacture angles and parallels as shown underneath surface plate.



We also make larger and smaller plates either with planed or scraped surfaces, whichever is desired. Write today for full information.

### I. C. BUSCH COMPANY

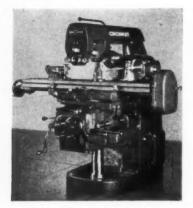
165 SO, BARCLAY ST.

ENGINEERS AND MACHINISTS SINCE 1907

MILWAUKEE 4. WIS.

### NO. 2 MI MILLING MACHINES

A new medium sized knee-and-column type milling machine, has been an-nounced by The Cincinnati Milling Machine Co. Designated their No. 2 MI, the machine is powered by a 5 hp motor, and built in Plain, Universal, and Vertical styles.



These machines have speed and feed ratios of 60 to 1 and 120 to 1, respectively. Sixteen spindle speeds, ranging from 25 to 1500 rpm are changed with a single crank type control. While the spindle is rotating a safety interlock prevents the speed change crank from being moved.

There are sixteen feeds, from 1/4" to

30" per minute.

The spindle of horizontal machines runs on three precision bearings; tapered roller at the front center, and ball bearing at the rear. Extra metal on the bull gear produces a fly-wheel effect.

Parts within the column and knee are automatically lubricated from individual pump and cascade systems, with tubing carrying oil to out-of-the way bearings. The pump in the column also supplies oil under pressure to the hydraulic gear shift mechanism.

Feed controls are independent of each other, and each feed lever has a forward,

neutral, and reverse position. Cross and vertical hand cranks are automatically disengaged when their respective power feed lever is engaged.
"Live" rapid traverse, at the rate of 150

inches per minute longitudinal and cross, and 75 inches per minute vertical, may be engaged through a lever control at the side of the knee.

Like the overarms for other Cincinnati Milling Machines, this unit for the MI is a rectangular shaped casting, fitted in dovetail ways at the top of the column. built-in vibration incorporates a damper, reducing the need for the arbor support brace except for the most unfavorable cutting conditions.

Electrical controls are built in for protection against dust, coolant, damage and carelessness. A unique coolant system features complete enclosure of the centrifugal pump, drive shaft, and the greater portion of the coolant supply pip-

The main drive clutch, brake, and all spindle drive gearing up to the back gear shaft is contained in a unit bolted to the rear wall of the column. Likewise, feed drive gears are contained in a unit bolted to the under-side of the knee.

rotating shafts are completely

covered to protect the operator.

Vertical style machines have essentially the same controls and construction as horizontal machines.

Feed rates to the head range from 1/8" to 15" per minute, while the rapid tra-verse rate is 75" per minute.

Many attachments are available, such as circular milling tables, several types of vertical and universal spindle attachments, motorized overarm, and manual controls at the rear operating position.

Literature on all styles of No. 2 MI Milling Machines may be obtained by writing to The Cincinnati Milling Machine Co., Cincinnati 9, Ohio.

M-30 DIAMOND MILL

A new M-30 miller is designed primarily to provide high production for a wide range of milling applications. It features a 7"x30" table, 18" longitudinal travel, 6" transverse travel and 10" ver-

tical travel.

It is equipped with variable speed drive, built-in gusher pump coolant system and is delivered with a 1½ hp motor. Spindle nose is hardened and ground with No. 9 B & S Taper and the spindle is mounted in Timken taper roller bearings which are adjustable for takeup. Automatic screw table feed is available for tool room use or rack and pinion table feed for high production operations.

This is Diamond's largest, heaviest mill. It is rigidly constructed and the 1½ hp motor supplies power for heavy cuts in all metals without stalling or chattering. The full line of Diamond milling machine

accessories is available. Additional information will be fur-nished by Diamond Machine Tool Co., 3429 East Olympic Blvd., Los Angeles 23, Calif.



# Precision Taps

### AT LOW COST

### Grinds straight and spiral Flutes

A specialized machine ideally adapted for fluting and gunning of taps, reamers, angular cutters, milling cutters.

In addition the 50F Automatic Flute Grinder sharpens circular metal cutting saws singly or in gangs.

Fully automatic — anyone can operate it. The WARDWELL Mfg. Co., 3165 Fulton Road, Cleveland 9, Ohio.

Write for Bulletin 50F

WARDWELL

Specialists in Developing Saw and Tool Sharpening Machinery

### Immersed Electrode SALT BATHS







Austempering-Martempering-Cyanide Hardening

Past — Efficient — Economical

DEMPSEY-ROLNICK Immersed Electrode Salt Bath Furnaces — available in 27 standardized sizes ranging from 400° to 2400° — for all Isothermal and high speed steel treatment. Large, widely spaced electrodes assure low current density and eliminate high localized temperatures.

Our Engineer will gladly show you how this type furnace will answer your problems.

FURNACES: Gas-Electric-Oil-"TAILORED" by DEMPSEY

Meet every Heat Treating Need

Write for Bulletin 3-7



MPSEY INDUSTRIAL FURNACE CORP.

Seringfield 1. Mass.

### DIESEL DRIVEN WELDER

The newest addition to the Hobart "Multi-Range" welder line is an engine driven arc welder of 300-amperes capacity. Powered by a two-cylinder, unit-injection Diesel Engine, that features oil cooling, displacement blower, fuel filtration and easy starting, it is claimed this welder will cut fuel cost considerably. The engine has a 4½" bore and a 5" stroke, and is rated 47 hp at 1450 rpm.

Equipped with patented "Multi-Range" Dual Control and exclusive remote control, this new welder permits operator to make fine volt-ampere adjustments right at

work, eliminating unnecessary steps from work to machine and back to work. Its 1,000 combinations of voltage and amperage permits operator to select the right arc intensity to suit any job. Other features of the welding generator include separate excitation and two way ventilation, for a smoother, more productive arc at all current values.

Welding generator has a rating of 300 amperes at 40 volts. Current range for welding duty is from 20 to 40 volts, 60 to 375 amperes. It is a single operator variable voltage type, with four laminated main poles and four interpoles (commutating poles). Pole pieces are removable. Unit also has oversize, four-pole exciter built in on main shaft that insures quick are recovery and build-up, and eliminates accidental polarity reversal.

Engine controls are conveniently located alongside generator control cabinet. This panel carries a push button for self starting, water temperature gauge, oil pressure gauge, battery ammeter, booster, and pull type control to shut down engine. Engine speed is controlled by a governor and idling device which automatically shuts down engine to idling speed 12 to 15 seconds after operator has stopped welding. To bring engine to normal welding speed, the operator merely strikes an arc. When welding, the governor controls engine speed without interference from idling device.

This new welder (stationary model) weighs 2,637 pounds dry and can be mounted readily on wheels, trailer or



truck for easy portability. Optional equipment includes pneumatic tired 4-wheeled trailer.

### STANDARDIZED PUNCHES AND DIES

A new catalog of complete R-B products is announced by Richard Brothers Division of Allied Products Corp., 1560-74 E. Milwaukee Ave., Detroit 11, Mich. The catalog—consists of 48 pages printed in three colors, in an attractive plastic-bound cover.

The complete lines of standardized R-B Interchangeable Punches and Dies together with all the parts and accessories which make up the full R-B punch and die sets, are featured in illustration and fully described, with specifications and prices of each. In addition are pages devoted to other products of the R-B line which include standardized Composite Die Sections, Guide Pins, Bushings, Dowel Pins, Socket Head Set Screws, Cap Screws and Stripper Bolts, Rubber Strippers and miscellaneous die makers supplies.

Illustrated, too, are many special punch retaining plates and special punches and dies, typical of the service offered on special types and sizes of punches and dies to suit any requirement. To round out the catalog, several pages are devoted to hardness conversion tables, stamping pressure chart and other technical data, handy index and ordering instructions.

### PERECO MODEL 220-W

A versatile heat treating furnace in the low cost field available to small workshops and laboratories, utilizing temperatures up to and including 1850°F, has just made its appearance. It is a product of the Pereny Equipment Co., 842 N. Pearl St., Columbus, Ohio, manufacturers of a complete line of furnaces and kilns.

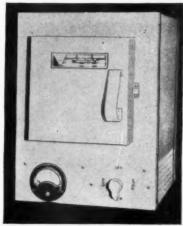
It is especially suited to the needs of the small laboratory, workshop or the amateur metal worker or school classroom. This new furnace, known as Pereco Model 220-W, is applicable in plastics, heat-treating of metals up to its peak range, porcelain enameling, jewelry enameling, laboratory control work, etc., in addition to its ceramic application.

It is built for either laboratory or production work. This includes hardening, annealing, drawing, carburizing or melting metals; preheating high speed steels, melting or annealing glass and ceramic

firing.

Designed for the inexperienced operator to produce satisfactory results, the 220-W is making a strong bid to establish itself as one of the leaders in the varied line of furnaces and kilns of the Pereny Company. It is quality insulated; has a wall-thick hinged door and has resistance wire

wound embedded elements for heating to its high temperature. Operating on 115volts and drawing 1500 watts, it is a pacesetter in low cost operation for small operators.



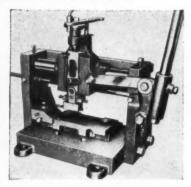


### BENCH MARKING MACHINE

Model E. P. 1 Bench Marking Machine is a hand operated unit which can be easily tooled for marking pieces of varied sizes and shapes.

A hand lever draws carriage to which marking die is attached along a round slide bar. Where the work may be slightly tapered from front to back, jack screws

provide an easy adjustment.



Both flat and cylindrical work can be marked on either the top of a small angle plate, or directly on the machine base plate. Length of inscription made by machine depends on depth of impression required, kind of material and size of char-acters. Generally 2" on steel and 3" on brass are the outside limits.

Because of its simplicity of operation, the machine can turn out a large volume

of work.

It is manufactured by Edward Pryor & Son, Ltd. Sheffield, England. Exclusive agent in the U.S.A. is Wm. A Force & Co., 216 Nichols Ave., Brooklyn 8, N. Y.

### SUNDSTRAND PUMP BULLETIN

An attractive new 12-page bulletin has been issued by the Pump Division of the Sundstrand Machine Tool Co., 2835

Eleventh St., Rockford, III.
Entitled—"Sundstrand Hydraulic 'Circuit Control' Pump" this bulletin illustrates and describes the operating principles, features, possible applications, and engineering data. Several typical installations are shown and described.

Other types of Sundstrand Hydraulic Equipment—Oil Power Transmissions. Oil Power Fluid Motors, and Hydraulic

Pumping Units are included.

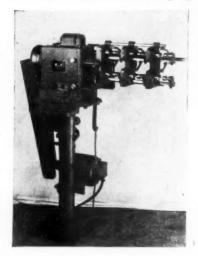
### HIGH SPEED GRINDING

The Electro Refractories & Alloys Corp. of Buffalo, N. Y., has published a 64-page booklet entitled "High Speed Grinding." This booklet is illustrated in many colors. There is much information concerning the use of grinding wheels. Types of abrasives, size of grit, construction elements and functions, and many other deare discussed. The booklet has a great many useful charts, tables and diagra-matic sketches. tails which are necessary to proper use

Those interested in this booklet may obtain all necessary information by communicating directly with the corporation.

### MULTI-CHUCK COIL WINDER

A new coil winding machine has been produced to speed up production thru multiple winding. Rather than using only one winding station, it has a maximum of eight. While one or more spindles are working, the operator can be reloading those that are idle, thus eliminating any

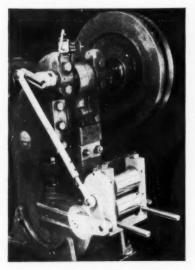


loss of time. The speed at which work may be done depends upon the ability and speed of the operator in reloading. The two photographs show various arrangements of the machine. Further information may be obtained from the manufacturer—The Globe Tool and Eng. Co., 420 Davis St., Dayton, O.

MARTIN ROLL FEEDS

An interesting new Roll Feed for light

reses is offered by Resco, 2020 Santa Fe Ave., Los Angeles 21, Cal. These Roll Feeds were developed primarily for the Toy Trade on the Pacific Coast, large users of punch presses up to six tons capacity.



With these feeds, it is asserted that manufacturers were able to increase production of various parts from the average of 2,500 pieces per hour to over 25,000 pieces. These roll feeds are jig bored to close limits and all parts are of hardened and ground construction.

The makers stress the fact that precise

mmm OF KALAMAZOO "400" Eliminate costly hand filing, grinding, deburring and many other operations
. . . There are "101" applications for the 400 in your plant. Write for bulletin.

1614 Douglas Ave. . Kalamazoo 54, Mich.

indexing of these feeds adds materially to the life of dies by eliminating faulty in-dexing and "half holes,"

It is claimed that original die cost is lowered by the complete elimination of triggers, stops and hitches.

One operator is able to tend several presses with consequent saving in labor costs.

Incidently, this company also special-izes in the manufacture of small high production dies. When dies are provided to operate in connection with these feeds, the customer can count on high production at minimum capital cost,

### GAGEMAKERS SUPPLIES

HDN. PLUG BLANKS, A.G.D; SNAP GAGES, INSULATING GRIPS, ALUMINUM HANDLES, POLISHED, & ANODIZED. LAPPING COMPOUNDS, LOCKING SCREW ASSEMBLIES, SNAP GAGE, PLUG GAGE LAPPING MACHINES, BUTTONS & LOCKING SCREWS.

SEND FOR PRICES

AMERICAN GAGEMAKERS SUPPLY CO. 11706 WOODWARD AVE. DET. 3 MICH.

### PREPARING BEARING SHELLS FOR BABBITTING

Years ago, when the predominant number of large babbitted bearing shells were made of cast iron, a series of axial circumferencial and dovetailed slots were cut into the bores of the shells prior to pouring of babbitt. Babbitt. being composed largely of tin and lead, will not bond readily to cast iron and therefore the intent of the slots was to assure anchoring of the babbitt linings to the shells.

In the transition from the use of cast iron to steel and bronze shells which would bond to babbitt, these slots were

dispensed with in the smaller sized bearings. The larger bearings however, regardless of material, still carried the slots as an additional factor of safety against the chance of having the babbitt lining

loosen away from the shell.

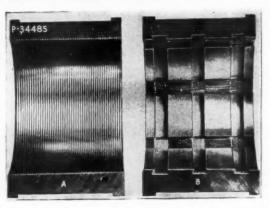
Early in the last war, the importance of saving man and machine hours plus the critical shortage of tin resulted in the acceptance of a shop suggestion to replace the slots with a serrated bore. Such a bore would present more surface for the babbitt to bond to than a smooth bore. A 12-pitch serration was decided upon which gives approximately 50% more surface per linear inch than a smooth bore. The saving in babbitt that formerly filled these slots was considerable and the saving in man and machine hours was indeed welcome. The slotter operation (axial dovetails) was completely eliminated and the entire bore is finished on the lathe or boring mill on one setup.

This serrated bore is now used on all bearings except those made of cast iron and aluminum bronze, which will not bond to babbitt without special salt bath treatments or electroplating.

By A. A. GOODMAN,
Steam Division, Westinghouse Electric Corp.,
South Philadelphia, Pa.

### FORGING BROCHURE

The Pittsburgh Forgings Co., Coraopolis, Pa., and the Greenville Steel Car Co., Greenville, Pa., have published a pic-



torial review of the history, manufacturing facilities and war production of their companies. It tells of the typical products of the forge plants as produced for war and peace. Profusely illustrated, it is a very attractive presentation.

### RESISTANCE WELDING

Two new bulletins on resistance weldare now available. One of them, No. 5-003, concerns portable welders. Three types are illustrated, they are air, manual, and hydraulically operated welders. A welding data chart and suggestions to aid in the selection of portable equipment are included.

The second bulletin, No. W-2-413, deals with heavier machines, known as the "W" type spot welders. These are foot, air, or motor operated. This bulletin is designed to assist in the selection of proper resistance welding equipment for specific production jobs. Both bulletins are available from the Taylor-Winfield Corp., Warren, Ohio.

### AIR-HYDRAULIC PRESSES

Air-hydraulic presses having ram pressure controlled up to 5000 lbs and adjustable stroke of 1/16" to 5" and adjustable ram speed, are now described in a new 8 page bulletin. These Presses are widely used in riveting, forming, light broaching, crimping, stripping, heat sealing and assembly operations. Catalog and price list free upon request. Air-Hydraulics, Inc., 401 Broadway, New York 13, N. Y.



# SENSATIONAL, NEW, EXPANDING MANDREL DESIGN · · · OPERATION CYCLE SPEEDED — EXTRAORDINARY PRECISION

CURTISS-WRIGHT CORPORATION RANKS OUR PRODUCT WITH THEIR BEST TOOLS, CLEVELAND GRAPHITE BRONZE COMPANY, LEADING BEARING MANUFACTURER, STATES NEW HIGH ACCURACY REACHED, PLUS SUBSTANTIAL PRODUCTION BOOSTS.

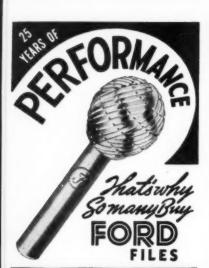


### YOUNG ROLLER CLUTCH PRECISION MANDRELS

NO MORE "C" WASHERS, WRENCHES, DRAWBARS, NO MORE ARCS OR TAPERS BEFORE OR AFTER EXPANSION GRIP — CONCENTRICITY IN LOW 10,000ths — PRODUCTION OR INSPECTION,

Assured parallelism of sleeve surface to center line—absolutely no variation in repeated mounting of parts absolutely no variation in repeated mounting of parts seemplete control and contact of entire bore surface area. Slip part on mandrel with slight counterclockwise motion, that's all—it's ready—Self-contaction. Instant unloading, no jamming, no adjusting—Interchangeable sleeves—you do not obsolete Young Mandrels.—Built to your bore tolerance high limit, with automatic contraction to low limit—Any mounting—Any machine operation—For bore diameters .718 to 5.5.—Reduces tool costs, extra equipment investment, operating costs, maintenance, down time, scrap, salvage.

YOUNG ARBOR COMPANY, 3257 Bradford Rd., Cleveland Heights 18, Ohio



M. A. FORD MFG. COMPANY, INC.

### **PUNCHES** and DIES



A large range of round, flat, square, and oval sizes is carried in New York stock.

Special Tools and Odd Sizes Made to Order

Catalog No. 8 covering our complete line of metal-working tools available.

T. H. LEWTHWAITE MACHINE CO. 311 East 47th St., New York 17, N. Y.

### TROYKE ROTARY TABLES



Sizes 9", 12", 15", 18", 21" & 25".

Ask your dealer or write us for eight page catalog.

TROYKE MFG. CO.

4422 Appleton St.,

Cincinnati 9, 0.



### SPIT FIRE LAPPING MACHINE

This new low cost machine is designed for high speed precision flat lapping of single parts or production runs of hard-

ened steel, quartz, glass etc.

According to the makers it is possible to obtain a surface finish as fine as 2 rms micro-inches. Single pieces ordinarily require no holders, chucks or collets . . . the operator merely laying the piece on the revolving circular lapping plate and directing its motion with his hands. Pro-duction lapping of large quantities of small parts is done rapidly by use of standard or special holders to suit the particular requirements. These holders are also available at low cost.

The machine has many uses, among which are precision flat lapping of machine and tool parts; flat sliding surfaces; flat rotating surfaces; air-tight and li-quid-tight seals, and flat surfaces on plastic molds, die-casting molds and

drawing dies.

Extra standard or special lapping plates for various uses are available at low cost, These plates are easily put on and taken off machine without tools of any kind, as no bolts, screws or fastenings are necessary to hold plate on machine.

For further details, address Spitfire



Tools, Inc., 2933 N. Pulaski Road, Chicago 41, Ill.



### MACHINE PRODUCTS CORPORATION

6767 E. McNichols Road

Detroit 12, Mich.

### MILLING TAP THREADS

The James Coulter Machine Co., Bridgeport, Conn., has entered another field with their Coulter Type "H" Hob Thread Milling Machine. This time the machine has been improved to cover the field of Tap Thread Milling Equipment, for both straight hand taps and taper pipe taps.

With the new relieving attachment, taps with any number of flutes, with eccentric or with concentric reliefs can be produced. All reliefs are the same, as one revolution of the relieving cam generates one flute on either straight or taper taps. The relieving arm leverage is adjustable to give the amount of relief desired.

With the new design overarm tail center and large collet chuck, the work is held rigidly so only one revolution of the tap is required for the finished product.

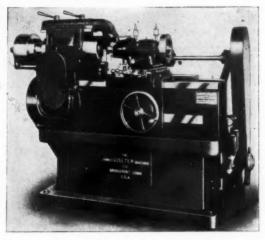
The Coulter Type "H' Tap Thread Milling Machine has sufficient capacity for pipe taps from ½" size up to and including the 1½" size and straight taps from ¼" up to and including 1½" size.

Detailed information may be had by submitting blueprints for production estimates and quotations.

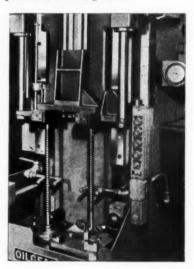


Holes in two automatic levers are broached per cycle on the Oilgear Type XP-10x30" Stroke Vertical Pull-Down Broaching machine shown. The machine was designed and built by The Oilgear Co., Milwaukee 4, Wis.

Approximately .052" stock is removed in finish broaching the 1" holes in each forged steel part. The front drag line bell crank is handled in the lefthand fixture and the brake pedal in the righthand fixture. Production is 350 parts per hour. The operator merely loads parts roughly in fixtures, depresses dual safety pushbuttons to start cycle and removes broached parts. Both tools are handled automatically by machine and parts are



accurately centralized by shanks on tools as they move downward. Both tools are secured on both ends during the major portion of broaching stroke.



### INSIDE "INFO" ON BEARINGS

Unique experiments with transparent plastic models of machine bearings are revealing "inside information" that may result in more powerful motors for the nation's factories, research engineers of the Westinghouse Electric Corp., disclosed recently.

The plastic models, which glisten with the brilliance of costume jewelry, are enabling scientists to look inside moving bearings and see what is happening to the lubricating oil—something never before possible, according to John Boyd, Westinghouse research engineer who developed the novel technique.

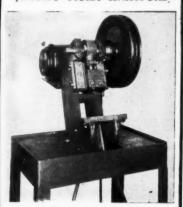


One peek at these plastic models in operation often is better than weeks of mathematical calculations. Guess-work is eliminated. Now engineers can see what is happening and can design bearings which will handle heavier loads and help make possible more powerful motors without any increase in size or weight.

The procedure is simple. Oil, colored with a red pigment, is fed into the bearing model and the lubrication effectiveness quickly is apparent. Engineers know at once whether the seals work properly, whether the oil passages are enabling proper flow of the lubricant, and whether the relief points are located correctly. All

# HUB POWER PRESS

IMMEDIATE DELIVERY \$240.00 F.O.B. HARTFORD



### 6 TON HUB PRESS

14" - 72 lb. Flywheel
Double V-Belt Drive.
Safety Non-Repeat Clutch
Crankshaft Bearings — Bronze—21/4" x
17/6" and 11/6" x 13/4"

Adjustment on Gibs
Adjustable Ball Joint — 11%" One inch

Punch Hole — one inch Inclinable — 38°. Pressure at bottom of ram — six tons.

Die Space — 6".

Bolster Plate — 6 x 8".

Opening, 5\%" x 3\\2"

Steel table — 21 x 18 x 28" Shipping weight — 300 lbs.

HUB POWER PRESS
W. F. BREWER MACHINE CO.
75 Laurel St., Hartford 6, Conn.

this formerly had to be determined, very

largely by trial and error.

Blocks of Lucite, a transparent plastic, are machined to close tolerances just like metal to form the models of bearings and journals. During the actual operating

journals. During the actual operating tests, rotating elements of the finished models are operated by a hand crank for slow speeds and are motor-driven for

high speeds.

As the red-colored oil works its way thru the bearings, engineers can see whether the grooves which distribute the oil are properly placed to do a thoro job. If these oil passages are not in the right positions, some areas will be "starved" for oil and the bearings cannot carry full loads. This, in turn, reduces the amount of work which the motors can beardle.

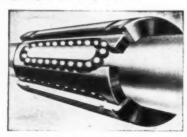
After watching the transparent models in operation, the engineers can redesign the bearings so that thoro lubrication is assured. This enables the entire length of the bearings to shoulder the burden and the motors can do bigger jobs.

LINEAR MOTION BALL BUSHINGS

There are two fundamental mechanical motions—rotary and linear. Anti-friction bearings are now available for both basic

motions.

Thomson Industries, Inc., Long Island City, N. Y., announces standardization of their round shaft type Ball Bushing, bringing to the designer, a bearing for linear motions that possesses all the advantages and economies that ball bearings impart to rotary motions.



In addition to the reduction of wear, friction and maintenance afforded by all types of anti-friction bearings, the availability of Ball Bushings offers the engineer a solution to two troublesome problems inherent in plain sliding linear bearings.

The oil film, over the exposed surface of the shaft upon which the plain bearing's operation depends, deteriorates due to oxidation and becomes gummy and grit laden. Elimination of the obvious consequences of this condition is a major contribution to modern mechanism design.

Plain linear bearings require a large length to diameter ratio to prevent cocking and binding. Free rolling Ball Bushings sharply reduce this dimension requirement and permit startling design economies. The size, weight and cost of countless mechanisms can be scaled down by the ingenious application of this new weapon in the war against friction.

According to the makers, Ball Bushings also offer the other advantages of ball bearings, such as savings from the use of smaller drive motors, gears, linkages, etc.; operating economies due to reduced load; longer life; increased reliability; less servicing; higher operating speeds

and sustained precision.

Standard sizes vary from ¼" shaft size to 4". Sizes from ½" to 1" vary in ½" steps; from 1" to 3" in ¾" steps and from 3" to 4" in ½" steps. Production of some of the smaller sizes is now under way. Volume production of the remaining sizes will be started as rapidly as the tooling for each can be completed. A booklet containing complete engineering information is now available without obligation.

Standardization for square shafts is not yet complete but this type can be furnished on an experimental basis for prototype equipment. Actual production is scheduled for later this year.

PHASE MICROSCOPY

New equipment which transforms an ordinary light microscope into an instrument that extends the range of human vision far beyond the limits of present microscopes is announced by American Optical Co's., Scientific Instrument Division

Officials of the division, which is one of the manufacturing units of American Optical Co., Southbridge, Mass, said the new equipment, when added to a standard microscope, permits observation and study of many living cells, tissues, microorganisms and industrial materials so transparent that heretofore little or no detail could be seen in them.

This fundamental advance in the use of the microscope is called phase microscopy and the converted instrument a phase microscope, the officials added.

The new microscope equipment consists of newly developed light-controlling diffraction plates. Placed in an objective

lens system, the plate makes detail visible within a specimen by increasing, reducing or reversing contrast in the image formed by the microscope.

The new phase microscope will be useful in the study of plant and animal life, parasites, emulsions, replicas of metal and other surfaces, glass and plastic transparent surfaces, minerals, crystals, synthetic fibers and other materials.

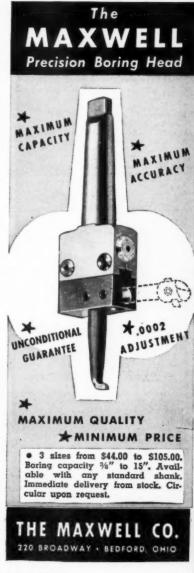
Equipment required to transform a standard light microscope into a phase microscope consists of a diaphragm for controlling light concentrated on a specimen and one of the new diffraction plates placed in the objective lens system. An auxiliary telescope used in place of the microscope eyepiece is helpful while centering the equipment. It is planned to make the equipment available for several models of the Company's Spencer microscopes.

#### ELECTRONIC BALANCER

To meet the requirements of industrial electric furnace users for accurate, automatic control of temperatures, ATC now provides in one device an instrument which they claim will do the job. It is the Electronic Balancer Input Controller, which the manufacturers say may be installed in any existing electric furnace temperature control system. In the words of the manufacturer, its control principle is "Proportioning plus Floating."

Further information concerning this instrument is found in Bulletin T-50, issued by the manufacturer of the controller, the Automatic Control Co., Inc., 34 E. Logan St., Phila., Pa.





### AUTOMATIC DRILLING AND TAPPING

Combined secondary operations—drilling, tapping, riveting, grinding, end-milling and many others—are controlled automatically by the Pond Operator Model 600, an automatic control unit developed by the Pond Engineering Co., Springfield, Mass.

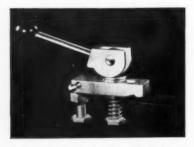
The illustration shows a Pond Operator on a standard base automatically drilling, countersinking and tapping on the center of a flat surface milled in the side of a cylindrical blank. Individual handling of the work is eliminated by hopper feed: positioning

hopper feed: positioning and holding of the part are also entirely automatic. A 25% production increase and a 90% saving in direct labor costs are claimed for this in-

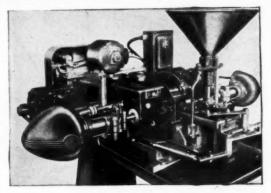
stallation.

The Operator is powered by a 1/3 hp motor, and a minimum of 70 lbs air pressure is required. Four air valves are standard equipment, but additional air valves or mechanical cams may be added by extending the cam shaft outside the housing. The air valve cams are adjustable for the frequency and duration of impulses per cycle, and the cycle speed is adjustable from two seconds to one minute, controlled by a simple adjusting knob. Longer cycles have also been made available on special order.

#### WESPO FIXTURE CLAMPS



Tool makers, designers and draftsmen will be interested in this new series of five Wespo fixture clamps for holding



work pieces. These clamps have ground stud washers with ground spherical radii —allowing the clamp to float and so compensating for irregularities in the work. The plastic ball clamp handle knob is another feature—allowing easier operation and greater convenience.

another feature—allowing easier operation and greater convenience.

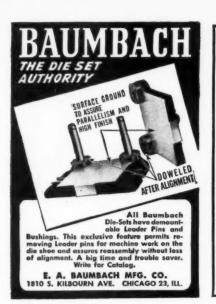
These clamps, designed and produced by the West Point Mfg. Co. Farmington, Mich., are all made of heat treated alloy steel, Cadmium plated. They come in five different types for different clamping methods and include quick action clamps as illustrated. Each type is made in six sizes—all are adjustable for height.

The makers are offering exact scale template drawings of each type and size which enable tool designers to include the right clamp in their fixture designs—saving both in designing time and fixture cost.

POWDER METALLURGY

Earl S. Patch and C. Robert Talmage announce formation of the partnership firm of Patch and Talmage to serve industrial companies in the field of powder metallurgy. Offices and laboratory are located at 4 South St., Stamford, Conn.

They offer a complete range of consulting services on powder metallurgy—research, applications, sales, management, materials, production and equipment. Special emphasis will be given in technical brochures under consideration to the use of powder metallurgy as a production process to avoid the necessity of secondary finishing operations that may be required by other processes on certain sub-assemblies as well as prime products and parts.





Every shop and tool room needs it . . . a strong, dependable unit . . . quickly set up in any vise.

SPRING WINDER

Increases production of hundreds of sizes of springs. Right and left.

Write for illustrated folder, giving complete details

### BLANER MFG. CO.

Corner Meek & Elm Sts.
SHARON PENNSYLVANIA

TOOLS BORING, FACING & INTERNAL THREADING Boring Int. Threading For holes from 1/8" upward, 15 different sizes. Made of Super-High-Speed Steel Specially Heat Treated Indispensable for your JIG BORER. The wormlike spiral of the boring heads provides a long, useful cutting surface. Their use insures perfect fitting threads Correctly designed for precision work. Write for Complete Data 738 Breadway New York 3, N. Y.

### COMPOUND DIE FEEDING MECHANISM

A simple feeding mechanism used for feeding strip stock thru a compound die is shown.

The arm attached to the left side of the upper part of the die positions the material with each operation of the press. On the down stroke of the die, the taper on the side of the arm pushes the stock forward into the proper position for the punching operation.

At the top of the return stroke of the die, the swinging arm hangs above the next punched hole, ready for the next punching operation.

The only restriction on this type of feeding mechanism is that the stock might be too thin to stand the pushing action,

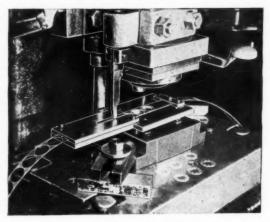
By M. Kafantaris, Westinghouse Electric Corp., East Springfield, Mass.

#### HACK-SAW TENSIOMETER



A "Tensiometer" has been designed to set and maintain correct blade tension on power hack saws. It is a small cylinder, enclosing a strong, calibrated helical spring. It is easily attached to the blade holder of the machine and acts as a shock absorber for the blade, automatically compensating for changes of feed pressure, thermal expansion and contraction, and unusual shocks such as the blade striking a hard spot in the metal being cut. By positively controlling any desired tension from 0 to 4000 pounds the "Tensiometer" is claimed to:

1-Improve the accuracy of cut.



2—Maintain substantially constant tension in spite of lengthening of the blade due to heating and eye elongation.

3—Absorb shocks, minimize blade breakage.

4—Greatly increase the cutting life of the blade and improve the complete cutting operation.

The machine operator, by reading the calibrated indicator, can readily set the tension at the desired figure. The "Tensiometer" is easily set by hand to a tension of 3000 pounds without using a wrench.

The company gladly arranges trial runs on the machines of any firm—large or small—that desires a demonstration. For further information on how to put the "Tensiometer" to use in your metal cutting operations write to the Millers Falls Co., Greenfield, Mass.

### PLATING BARREL CATALOG

Modern Plating Barrels of all types and sizes are described and illustrated in a new catalog issued by Belke Mfg. Co., 947 N. Cicero Ave., Chicago 51, Ill.

Information and specifications on barrels from small lot to large multiple units are given. Unusual construction features of Belke Barrels are detailed. Materials used in making barrels for various types of plating are listed. Information on Dryers, Burnishing Barrels and other plating equipment is also included.

# AMC 2uich DEMAGNETIZER



A necessity where machine tools are used.

Standard units available and special sizes to order.

Write today for descriptive circular.

ALOFS MFG. CO.

1629 Madison

Grand Rapids, Mich.



No. 16 5 TON INCLINABLE POWER PRESS

ACCURATE DURABLE

WEIGHT ... 520 lbs.

CRANKSHAFT, dia. main brgs. . . . 15%" at C.S. brgs. . . . 134"

RAM stand stke...!"
maximum stke. ..2"
(to order extra ch'ge)

OVERHANG, center of slide to frame 31/2"

MOTOR required, 1/2 HP 1200 RPM For Further Details Write

MICHAEL AMENDOLA & CO. 1059 Washington Ave., Bronx 56, N. Y.



REAL MONEY-SAVING CONVERSION

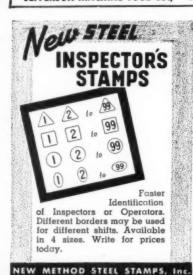


### Turn Bench or Engine Lathe Into a TURRET LATHE

Convert up to 24" swing . . for forming, roughing, boring, drilling, tapping, finishing etc. No need to stop lathe or change tools,

WRITE FOR MACHINE TOOL CATALOG

JEFFERSON MACHINE TOOL CO., 700 W. Fourth St., Cincinnati 3, Ohio





NEW BRITAIN TOOL & MFG. CO. NEW BRITAIN, CONN., U. S. A.



# DIAMOND SIME TOOLS

Further

Information.

Diamonds vary in quality and it is important to use the proper kind for a given job. "Bargain diamonds" are not an economy.

If you don't know diamonds know your diamond dealer. Our 45 years in this field merits your confidence.

ACME DIAMOND TOOL CO.

15 MAIDEN LANE, NEW YORK, N. Y.

DETROIT 7. U S.A



### THE DRILL WITH A HUNDRED AND ONE SPEEDS

ALL SPEEDS INSTANTLY AVAILABLE WHILE MACHINE IS RUNNING

> TWO MODELS M125—3/8 CAP. M96—7/8 CAP.

SEND FOR CIRCULARS

THE TAYLOR & FENN CO. HARTFORD, CONN.



### DO YOU HAVE A LIFTING AND CARRYING PROBLEM?

Solve it with Portelvator, the Hamilton Portable Elevating Table. No other unit of equipment does so much for so little.

Standard models lift and carry loads up to 5,000 pounds. Special models built to solve "out-size" problems.

Used to lift to desired height for any operation, then smoothly rolled to the next machine and height-adjusted as required. Used as a level under overhanging work; as a portable work bench; to charge and discharge heat treating furnaces. Used in tool room and stock room, in loading and unleading.

Write for descriptive literature today ... now, while that good impulse holds. (It doesn't cost a cent to find out!) Address Department A.





Hamilton

SUPER SENSITIVE DRILLING MACHINES TAPPING MACHINES PORTELVATORS

TOOL COMPANY

NINTH STREET AT HANOVER . HAMILTON . OHIO . U . S . A

of their well-known micrometer dial gauges and micrometer dial indicators.

The B. C. Ames Co. has sold its manufacturing rights in Ames Bench Lathes,

tors. Ames Precision Machine Works, Waltham 54, Mass. The owner of the latter concern is Ira R. Ames, who formerly was affiliated with the B. C. Ames Co.

Milling Machines and hardness testers to

"SHEARCUTTER" TOOL

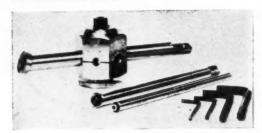


It is claimed to embody new scientific developments in the shearing of metal by a true molecular cleavage action.

An outstanding feature is the new circular cutter bit. Fastened securely to the end of a specially

designed holder, the circular cutter bit is said to utilize a new technique in cutting metal. According to the makers, the penetration angle is such that a shearing action is attained and as a result of this knife-like action mirror-like finishes are produced and there is a great reduction in the heat of friction usually produced by conventional tools as they "tear" off the metal.

An interesting feature is that 20 to 50 new, sharp cutting edges may be presented to the work by simply rotating the bit. This eliminates the necessity of stopping production at frequent intervals to resharpen the cutting tool. When resharpening becomes necessary, the circular bit



is removed and can be resharpened in one minute. There is no worry about proper rake angles as the tool is scientifically pre-formed for optimum cutting. The makers assert that the life of the cutting edge is many times longer than that of conventional tools because of the shearing action and the way in which the chip removed in cutting slides back over the cutting edge thus tending to keep it sharp.

The new tools are being marketed complete with three bit holders, six bits and a new toolmaker's precision boring tool holder. For further information write to the Fearless Tool Co., 1234 So. Gramercy Place, Los Angeles 6, Cal.



Indicative of the influence American equipment and manufacturing methods will exert on China's long range industrialization is the current industrial tour of Chinese Supply Commission representatives. Shown watching a key step in the manufacture of precision ball and roller bearings at SKF Industries, Inc., in Philadelphia are two commission members, Pingsan Sun (left) and Chen Yu (right), both of Shanghai. From an SKF worker they learn how balls are ground to extremely fine tolerances for industrial uses.



AIR! at 295 m.p.h. with TORNADO

WHERE you want it, when you want it, portable anywhere, this poworful TORNADO Electric Blower, with a swooshl, cleans out motors, generators and machinery. 1 h.p. motor. Weighs only 14 lbs.

FREE TRIAL - write to

BREUER ELECTRIC MFG. CO. 5118 N. Ravenswood Ave., Chicago 40

With the Howe LINDSEY
AUTOMATIC
SAW SHARPENER
- HACK SAWS
- BAND SAWS
- CIRCULAR SAWS
- MEAT SAWS

Recondition old Saws

HOWE AND SON Inc. HINSDALE N. H.



& J PRESS CORP.

ELKHART INDIANA

successors to Luchbough-Jordan Tool & Machine Co.

## Lassy TAPPER\*

AND THREADER (Single Spindle)
SAVES TIME, TAPS, EXPENSIVE LABOR

Taps twice as many holes, quicker than with a tap wrench. Always right angle holes. Tap capacity 1/6" thru 1".



STEPPED HOLDING BARS. Replace Vise, hold work firmly prevent tap-breaking torque.

TAP ADAPTERS.
No extra spindles needed. Change taps in a jiffy.

DEPTH GAUGE. Always show depth tap has traveled.

Write for Folder B2

Immediate Delivery

## LASSY TOOL COMPANY

1625 STERLING AVE

### THER-MONIC INDUCTION HEATER



Model "1400" is the newest, largest, and most versatile in the growing line of Ther-monic high-frequency induction heating generators, manufactured by the Induction Heating Corp., 389 Lafayette St., New York 3, N. Y.

When fully loaded, this unit is said to be capable of delivering an output of 1400 B.T.U. per minute or approximately 25 kw. at a nominal frequency of 375 kilocycles into a piece of work. It is claimed to have a full-load input of 50 kwa at 90% power factor and operates on a 205-245 volt, 60-cycle, three-phase power supply. Since line voltages of 550 or 440 volts are common in some plants, provision is made for reducing these voltages to 220 volts through installation of a transformer between the line and the generator. A variable output control permits the power output of the generator to be adjusted from approximately 10% to full load by means of a single dial.

This new Ther-monic unit can be used for brazing, soft soldering, and fusing as well as for hardening, annealing, tempering, stress relieving, forging, melting, shrink fitting, debonding, and expanding.

#### SEVERANCE DEBURRING CUTTERS

Severance Tool Industries Inc. of Saginaw, Michigan announces development of solid tube deburring cutters which remove stock so cleanly, quickly, and smoothly that holding work in vises or other fixtures is seldom necessary.

The Severance standard combination tube deburring cutter was originally designed more than 10 years ago for an automobile manufacturer who required a tool for deburring ends of metal tubes used in seat framework. From this standand model the new one-piece solid tube deburring cutter was developed and is now being made in more than 100 different sizes for tubes of various wall thicknesses and diameters up to 2½". They are designed to meet varying deburring requirements, such as squaring the tube end to tube centerline or removing burrs without producing chamfer or radius.

These tools have proved of particular value in industries where tubing is widely used, as in refrigeration and air-conditioning fields. Solid types are being used successfully on seamless and thin wall tubing of aluminum, copper, magnesium, brass, various steels including stainless, and plastics. They may be used in drill presses, drill heads mounted horizontally, gear motors, and lathes, and in small sizes operate satisfactorily in portable power tools.



Severance also makes a complete line of chatterless and adjustable tube deburring cutters as well as inside and outside tube deburring cutters.



### WITH HERCULES HOLDERS AND TYPE

WRITE FOR

- 1 ILLUSTRATIVE LITERATURE AND PRICE LISTS
- 2 NEW BROCHURE ILLUSTRATING OVER 100 MODERN MARKING TOOLS AND MACHINES

CONSULT THE ORIGINAL "MARKING SPECIALISTS" FIRST!

ACROMARK Ompos

15 Morrell St.
ELIZABETH 4, NEW JERSEY







### Immediate Delivery!

Standard Size Dowel Pins from 1/8" to 1" diameter and from 3/8" to 6" length supplied in .0002 and .001 over basic sizes. Unless otherwise specified, .0002 oversize will be furnished.

### SCHULTZ & ANDERSON CO.

109 Edison Place, Newark 5, N.J.

# "OLIVER" METAL CUTTING BAND SAW

Powerful . . . cuts true and steady.

36-inch wheels.

Available with slow speeds for cutting most any metal including sprue. Also wood and

Quick-change

compositions.

Large capacity under guide.

Write for Bulletin 116-S



Oliver Machinery Co., Grand Rapids 2, Mich.

#### PRODUCTION SHORT CUTS

The technique of contour machining and its application in metal working shops is



clearly demonstrated in a new booklet entitled, "DoALL Equals Ten Plus", now available to shop superintendents, foremen, tool and die makers, machinists and students.

This is a handy, durable 22-page booklet designed for shopcoat pocket or tool chest. Its contents makes it a ready reference on machining operations. It is a pictorial time study of metal fabricating short cuts.

Graphic comparisons show how the productivity and life of more costly machine tools can be increased by relieving them of "hogging" operations that can be performed more economically on DoALI contour sawing machines, shapers, lathes, milling machines, etc., are thereby conserved for their specialized work and precision service.

This booklet is available free to anyone writing The DoALL Co., 1301 Washington Ave., South, Minneapolis 4, Minn. Ask for "DoALL Equals Ten Plus."

### HAMMOND BELT GRINDERS

An attractive new 8-page bulletin (No. 310) introduces three new Abrasive Belt Grinders offered by Hammond Machinery Builders, Inc., 1614 Douglas Ave., Kalamazoo 54, Mich.

Of these, the VH is a 6" Wet-n-Dri unit for speedy grinding, polishing, deburring beveling and similar operations on metals, plastics, ceramics, etc. The No. 5 Abrasive Belt Grinder-Polisher with horizontal platen is a versatile unit.

The F-2 Flexible Belt Grinder uses Abrasive belts 48" long and up to 2" wide. It is described as one of the most versatile small machines ever used in tool rooms, machine shops, etc.

Full details and illustrations are given.

ARTICLES ON SPECTROGRAPHY

A 16-page bibliography of articles and books on spectrography is available. The booklet lists articles and books covering the broader aspects of chemical spectrography, equipment and supplies, flash spectrography, infrared spectrography, mass spectrography, radiation sources, Raman Effect spectrography, and ultraviolet spectrography. It may be obtained without charge from the Industrial Photographic Sales Division, Eastman Kodak Co., 343 State St., Rochester 4, N. Y.

### MIKRO-INTERNAL INDICATOR

The Mikro-Internal Indicator is a new assembly of the Swedish Gage Company's line of Internal Indicators. The gage itself is an application of the Mikrokator frictionless amplification applied to the standard line of Internal Indicators.



The dial is graduated in .0001" with a scale range of .006" and for closer tolerances can be had with a scale range of .0024" graduated in .00005". These scale ranges and graduations can be had in diameter ranges of 13/16 to 6" with a standard measuring depth of 4".

It is rapid, reliable, sensitive, light, compact with positive repeat readings. It



### IMMEDIATE SHIPMENT

from stock-the famous MASTERCRAFT 700-R and 800-R compound slide and retary milling and layout table. A leader since 1936. Convert your drill press into a vertical mill for those light jobs. Eliminate expensive lathe face plate holding fixtures by using a Mastercraft table for precision boring and turning of multiple diameters. Consult your dealer or write to

M SALES CO. MFR'S. 1054 Cahuenga Blvd., Hollywood 38, Calif.

### Luma Soldering Tool RESISTANCE TYPE



For practically all soldering jobs. Large pieces-terminals—harnessed assemblies. High production, low maintenance. Localized heat at point of ap-plication. Safe and convenient to operate. Write for details.

LUMA ELECTRIC EQUIPMENT CO. TOLEDO I. OHIO P. O. Box 132 H

Low Priced Self-Contained Portable Sturdy

Ready to Work-Economical

EXPORT DEPT.

IIII SO. FERRY BLD'G.

NEW YORK 4, N.Y. Write for Bulletin No. 200

# THE WAY TO GREATER





BY USING SES HINGES







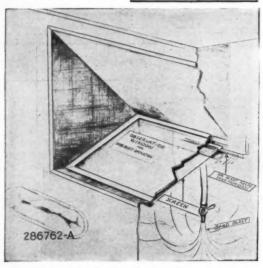
BUTTS AND CONTINUOUS LENGTHS - for GUARDS - CABINETS - CASES - BOXES - LUGGAGE WRITE FOR CIRCULAR

> S & S MACHINE WORKS HARDWARE DIVISION

4539 WEST LAKE STREET

CHICAGO 24, ILLINOIS

is especially adapted for checking internal diameters in size, out of round and taper, both in the shop and in inspection departments. For descriptive matter address Swedish Gage Co., 8900 Alfaine, Detroit 4, Mich.



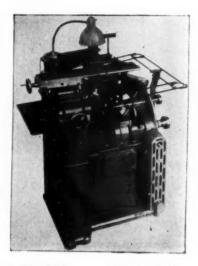
PROTECTS OBSERVATION WINDOW—Using a curtain of air to protect
the observation window of a sand blast room from pitting, engineers at the Bloomfield, N. J., Lamp Division of Westinghouse have reduced the number of replacements as much as 90 percent. A ½" pipe in which a number of holes have been drilled is mounted along the top of the window on the under side of the glass. As illustrated, the air forms a curtain across the window and deflects sand particles away from the glass. The pipe can be installed in any sand blast equipment by following the plan shown in the sketch.

### PROFILE GRINDING MACHINE

A profile grinding machine designed to solve the problems of profile grinding of hardened work pieces is being produced by Fritz Studer Ltd. of Switzerland for the American market. The precision claimed is plus or minus 0.0002". Maximum size for flat pieces is 2" thickness and 5.9 length, and circular pieces 4" in diameter can be ground.



Diamond holder and work piece are both fixed on a revolving table mounted on the vertical slide and can each in turn



How to remove burrs - FASTER

With the

new NOBUR tool you

can burr holes faster—improve

the finish of deburred parts and lower pro-

duction costs by eliminating burring as a bench

operation. The NOBUR tool works like a drill, making burring a last, easy machine operation. The NOBUR tool is available in 1/16" progressive sizes from 3/16" to 1" in diameter. Write today for new complete burring folder.

NOBUR MANUFACTURING COMPANY

910 North Orange Drive, Los Angeles 38, California



Miccro

upreme

LAY-OUT AND

IDENTIFICATION DYE

12 COLORS\*

For Tool, Die, Pattern or Template layout on metal . . . Quick identification of stock and parts . . . Shows up in sharp relief—dries instantly—easily'removed . . . Write for circular.

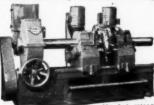
\*Purple shipped unless otherwise specified

MICHIGAN CHROME & CHEMICAL COMPANY

6340 E. Jefferson Ave. . Detroit 7, Mich.

# Roto - Matie

A combination of precision workmanship and advanced design contribute to the quality of output and quantity of work pleces produced on Roto-Matics. Production for exceeds that of standardized equipment used in the metal working industries today, because practically all operations are continuous eliminating down time for loading.



No. 1-A MILLER

Catalogue 8-90 illustrating and describing various types of drilling, milling, reaming and boring machines is available on request.

DAVIS & THOMPSON CO.

MFRS. OF MACHINE TOOLS & MICROMETERS

MILWAUKEE, WISCONSIN



# GEARS IMMEDIATE DELIVERY

Gears, speed reducers, sprockets, thrust bearings, flexible couplings, pulleys, etc. A complete line is carried in our Chicago stock. Can also quote on gears of any kind. Send us your blue prints and inquiries.

Write for Catalog No. 70

CHICAGO GEAR WORKS,

440-50 N. OAKLEY BLVD., CHICAGO 12, ILLINOIS be placed opposite the grinding wheel. Stroke of the vertical slide can be set from 0 to 62 mm (0 to 2.44"). A dust exhauster and balancing wheel may be obtained as accessories.

The photographs shown are of the machine, and of a sectional die that has been manufactured on a Studer PSM.

Their representative in the USA is the Cosa Corp., 5000 Chrysler Bldg., N. Y., N. Y.

### MICRO-SINE SQUARE

A new precision angle square known as the Micro-Sine Square is announced.



It enables shop men to check right angles and the accuracy of work to within one-ten-thousandth of an inch within a given distance. A standard indicator instantly shows error on an indicator dial and shows where and how much correction is required. It provides a standard for checking master squares, tri-squares and tools as well as jobs.

Made of hardened tool steel, it is of

Made of hardened tool steel, it is of ground and lapped precision construction and comes complete with master checking block and carrying case. It is available in two types. One has a standard precision gauge that reads in tenths, the other has a lever indicator that reads in thousandths.

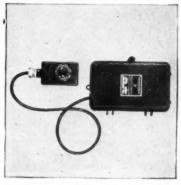
For complete details and prices write to Acro Tool & Die Works, 4554 Broadway, Chicago 40, Ill.

### PHOTOELECTRIC CONTROL

Photoswitch series 20 and 21 Photoelectric controls are designed for general industrial and machinery application. They are particularly recommended for such applications as counting, conveyor

control, short-range signal systems, motor or valve control, production inspection, machinery safeguards, stop-motion control in the textile, paper and wire industries, as well as automatic control for hundreds of specialized industrial processes.

These controls are adaptable to a wide variety of industrial applications because of the many unique features of Photoswitch design. The phototube which must be located at the point where operations are being observed is available either integral with the housing or in a small separate housing. This latter permits the use of the control where space is limited. A tamper-proof sensitivity adjustment is provided on the control housing to permit positive operation over varying distances between phototube and light source. Simplicity of installation is enhanced by having a single set of terminal board connections in the control to provide the supply current for the light source. The light source requires only low voltage wiring to this terminal board.



For further details write to Photoswitch, Inc., Broadway and 6th St., Cambridge 42, Mass.

### SPRING WINDERS

A bulletin has just been issued by the Blaner Manufacturing Co., 629 Meek St., Sharon, Pa. This covers four types of hand spring winders. These winders permit easy and rapid winding of springs of many sizes. All four winders have the same operating principle, but are of different sizes. They are built to be held firm in any vise. These winders should prove useful in many shops and factories.

furnished with special holes, cutouts and bends to blue-print in metals to suit the job.

THREE-FOURTHS OFFSET

AUTO MOULDING & MFG. CO.

1110 E. 87TH ST. CHICAGO 19, ILL. Open Width %" to 6"
Gage Material .040 to .125
Pin Diameter .101 to %
Lengths to 120"

SEMI-OFFSET



# Labor

Eliminate heavy lifting. Cut handling Table costs.

swivels and locks in any position. Can be varied 151/2 by slight foot pressure, leaving operator's hands free. Engineered and built by tool engineers, experienced in production of special machines, dies, jigs and fixtures for exacting requirements.

Send TODAY for illustrated catalog No. 2.

MIDWEST TOOL & ENG. CO. 112 Webster St., Dayton, Ohio



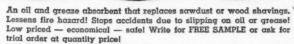
Pictured: a 38-Spindle Heavy-Duty Drill Head.

DESIGNERS AND MANUFACTURERS OF MULTIPLE DRILLING EQUIPMENT

We invite your inquiry.

MICHIGAN DRILL HEAD CO.





TAMMS SILICA CO., 228 N. La Salle St., Chicago 1, Ill.



### GITS BROS. MFG. CO.

Exclusive for over 35 years

1860 S. Kilbourn Avenue

Chicago 23, Illinois

### 2-MILLION VOLT X-RAYS

A 2,000,000-volt X-ray machine will be installed by The Babcock & Wilcox Co., Barberton, O. It will be the first use of a machine of this size for the purpose of examining welds in pressure vessels. The company was the first manufacturer of pressure vessels to have a 1,000,000-volt unit, and it will be the first to have a 2,000,000-volt unit.

By this purchase, the company will substantially increase the equipment used at the Barberton plant for examination of pressure vessel welds, raising to 12 the number of X-ray machines used there. Pioneers in the application of X-ray to search for flaws in pressure vessel welds,

the company explores every inch of main welds in such vessels. This examination is but one of many precautions taken to assure safe and sound process equipment. X-ray makes such 100% examination feasible.

Ground has been broken for a special building to house the new machine. It will be erected adjacent to the location of the present 1,000,000-volt X-ray unit. The building has been designed to protect personnel from radiation and to make possible examination of the largest size drums.

Altho the apparatus, which was purchased from the General Electric X-Ray Corp., Chicago, is capable of operating at any voltage from 1,000,000 to 2,000,000, it will be used principally at the higher voltages to take pictures of heavy welds, four inches thick and over. As compared to the 1,000,000-volt X-ray, this unit will produce much

clearer pictures in that thickness, and will reduce the average time to take radiographs by half. It can be used successfully on steel walls 10" thick, while the 1,000,000-volt machine can penetrate walls up to 6 or 7".

The specially-designed building will be 35 feet wide, 31 feet high, and 81 feet in length. The double walls consist of 42" of sand solidly packed between ¼" steel plates to prevent radiation from the unit. The building is planned to provide all possible safeguards to protect not only technicians within the building, but anyone in the immediate area.

An overhead floor-operated crane will support and move the X-ray unit.

# PRECISION ROTARY TABLES



9"—\$ 97.00 12"— 160.00

15"— 185.00

18"— 220.00 18"— 350.00 Extra Heavy

18"— 350.00 Extra Heavy Duty 21"— 500.00 Extra Heavy

25"— 590.00 Extra Heavy Duty

OUR ROTARY TABLE WILL TAKE THE PLACE OF A COSTLY FIXTURE. IT IS USED FOR ALL KINDS OF WORK ON MILLING MACHINES, SHAPERS, DRILL PRESSES AND HORIZONTAL BORING MILLS.

WE CAN ALSO FURNISH DIVIDING ATTACHMENTS.

SEND FOR LITERATURE AND DETAILS.

IMMEDIATE DELIVERY

SEND FOR 220 PAGE FREE CATALOG

LAFAYETTE TOOL & SUPPLY CO.

128 LAFAYETTE STREET

NEW YORK 13, N. Y.



# UNLIMITED PEAK PRODUCTION

Much larger die space than average presses. Engineered and designed for unlimited peak production.

Reinforced construction at points of greatest wear.

If you want the best, send for illustrated catalog describing complete line TODAY.

With Modern
JOHNSON
POWERE
PRESSESS

43 YEARS ENGINEERING EXPERIENCE BUILT INTO EVERY JOHNSON PRESS USED BY LEADING MFR'S. THROUGHOUT THE WORLD.

JOHNSON MACHINE AND PRESS CORP.,

ELKHART.



drivers and nut setters for all types of screws and nuts...from small watch screws to body bolts! Write for literature on precision-built ARO Tools for

Write for literature on precision-built ARO Tools for screw driving and nut setting... also for drilling, grinding, sanding, filing and other production jobs. See your Aro Jobber. The Aro Equipment Corporation, Bryan, Ohio. claimed they will give more cuts per sharpening.

Both internal and external keyway cutting are performed at the shaper in vari-ous plants. With re-gard to cutting ex-ternal keyways, many of the older shapers were designed with a throat, so a long shaft could be passed directly through the machine. Operators coming on to some of the modern shapers, which have no such throat provided, have sometimes been per-plexed when keyway work turned up, on long shafts. However, in this case, the vise for holding the shaft is placed at one shaft is placed at one side, on the shaper table, so that the shaft held in it passes the side of the shaper in the clear. Then, the shaper head is swiveled on the end of the row. the end of the ram, to the point where the cutting tool comes radial to the shaft. Thus, the tool feed is on an oblique line, but the keyway is cut as readily as though it were straight down. This throatless type of shaper construction allows additional strength to be incorporated in both the column and rocker

KEYWAYS AND KEYSEATS

One widely-used method of cutting keyseats and external keyways is at the milling machine, using cutters which have been especially designed for this purpose. Such cutters are often carried in a full line by manufacturers of milling machines, and it is often advisable to have a full selection of them at hand. It has also been observed that special curve-tooth milling cutters for keyways are in use in some shops. Designing the teeth with curves in the cutting edges gives a cutting edge that is actually longer, and also one that imparts a certain shear to the cutting action. It is

corpora arm.

Internal keyways, when cut at the shaper, require the use of a special extension shaper tool. A very short cutter is held in a horizontally-disposed round bar. This, in turn, is held in the shank of the tool, which has its working position in a vertical plane, and is held in the tool post. Extension shaper tools may be obtained in different shank, bar and cutter sizes.

Adjustable-expansion push broaches offer a fast means of cutting internal keyways, and are found increasingly

popular for the purpose.

# SAVES TIME -- MAKES MONEY MARSHALLTOWN THROATLESS SHEARS

CUTS ANY SHAPE
CUTS ANY SIZE
CAPACITY UP TO 1/4" STOCK

Here's the shear that offers best performance features. Cutting speed 6' per minute. High grade tool steel cutters. Write today for details. Prompt shipment.

MARSHALLTOWN MFG. COMPANY 900 Nevada Street Marshalltown, Iowa



# The Du Bois Verti- Zontal Rotary Table



Available in 11" size for immediate delivery.

Other sizes—delivery upon request.

Some territories open for Dealers.

A Rotary Table with both Vertical and Horizontal bases. The table can be set in a vertical or horizontal plane. When in a vertical position, the face of the table can be set at any angle with respect to the cutting tools.

DESIGNED FOR ACCURACY, FLEXIBILITY, AND RIGIDITY.

Fine workmanship, high grade materials, and expert engineering are built into each unit. An internal expanding bronze clamp ring that locks the Table is only one of the features that cannot be found in any other table.

A versatile tool for every tool room or shop!

Write for details and specifications

Industrial Equipment Co. P. O. Box 721 Tulsa 1, Oklahoma



• If you're looking for a way to offset increasing labor rates and meet the demand for lower production costs, take advantage of the many Federal features that assure more press work, finer press work, a wider variety of press work per dollar—safely! Write today for latest catalog on the complete Federal Press Line.

### THE FEDERAL PRESS CO.

1803 Division St., Elkhart, Ind. - Telephone 2831

#### SNAGGING

The type of grinder used for snagging castings will depend in every case on size of the work being handled. Small parts or castings that can be handled manually without a great deal of fatigue are usually taken to heavy floor grinders designed for such service. In many cases, castings too large to handle in this way, without tiring the operator greatly, are cleaned up with portable air-powered grinders that carry wheels from 4 to 8" in diameter.

However, for heavy snagging work on large castings, and where there is much of it to be done continually, a swingframe machine is the usual choice. In any case, the wheels that a re used for snagging service are very important.

Manufacturers of grinding wheels have given special attention to the production of wheels particularly adapted for this duty.

With regard to heavy floor grinders that have been designed for foundry snagging, some have provided machines with pedestals having central mounting points for the motors. so the grinding wheels can be mounted on arbors at both ends of long, extended motor shafts. These machines will stand much hard work and even abuse, day-in and dayout. The shafts are supported in very large and competent bearings adjacent to the grinding wheels.

However, some builders of heavy snagging grinders

supply machines that can carry large-diameter wheels. In order to make this feasible, it is necessary that some means of compensating for the reducing diameter of the wheels be provided, for obviously the surface speeds of the wheels reduce with the shrinking diameter. To maintain their maximum efficiency, the grinding wheels must be kept at a surface speed of 8,000 to 9,500 per minute.

To do this, one manufacturer has enclosed the motor in a hood at the rear of the machine, and provided a three-speed V-belt drive. Thus, the full sized wheels are first driven at the lower rpm.

### "MODERN" VISES...

are precision-built with hardened and ground jaws for rapid production work on milling machines, shapers and drill presses.

### CAM VISES...

Jaw dimensions: width 4" or 5", depth 11/2", maximum opening 2" or 3".

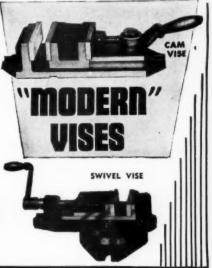
### SWIVEL VISES...

4", 5", 6". Write for folders

MANUFACTURERS OF PRECISION HIGH SPEED STEEL AND CARBIDE CUTTING TOOLS.

# MODERN TOOLS

Manufacturers of precision high speed steel and carbide cutting tools.



## Timesaver LAPPING COMPOUND



A gear lapped to precision, in assembly, with Timesaver Compound.

You can produce perfect fits, assure quiet operation and save money by substituting Timesaver for expensive hand scraping and running-in operations.

It is easy to use and rapidly produces perfect fitting bearing surfaces.

Used by leading manufacturers for the past twenty years for the fitting of all types of gears, bearings, valves, pistons, slides, etc.

Timesaver Compound will not imbed into any metal or continue to cut.

Grades for lapping hard and soft metals.

A request on your letterhead will bring free samples and literature.

### TIMESAVER PRODUCTS CO.

31 S. Desplaines St. Chicago 6, Illinois



## THE NEW Precision LINE OF COLLETS AND FEED FINGERS FOR BROWN & SHARPE MACHINES

IMMEDIATE DELIVERY FROM STOCK



The addition to the Precision line of collets and feed fingers designed for use in Brown & Sharpe machines gives you a dependable source for speedy delivery . . . And as always, the Precision name on these new collets and fingers is your unconditional guarantee of selected steels, uniformity in machining, grinding and heat treating. You will like their lasting spring quality and hair-trigger accuracy.

DO YOU KNOW THESE OTHER Precision PRODUCTS . . .

Precision lathe collets fit many machines and attachments including 10" Atlas, Logan, Craftsman, Powr-Kroft, South Bend, Clausing, Sheldon, Hardinge, Elgin, Dalton, Schauer, Sebastian, etc.



& BREN Collet Increase 1/2" collet cap, lathes to 1/4". r Atlas, Logan uth Bend, Claus

#### DIE AND STAMPING COMPANY GENERAL PRECISION COLLET DIV., 268 Mott Street, New York 12

Fits 3AT

It pays to specify Precision when callet work is indicated, because you get the best, and you get it promptly from stock. Order from your Industrial Supply Distributor, ... He is ready to serve you. Literature is available. Why not write for it today.

#### HARDNESS TESTING

This important phase of metal-working operations is assuming many ramifications as the years pass. Many firms are engaged in making hardness testing instruments, and they have gradually built up lines including various types.

Some of these are direct reading. Some are of conveyor and automatic types. Some operate by hand and others by power. Hardness testers are made in all sizes and for all purposes.

One hardness tester is operated by a foot lever. One simply inserts the piece to be tested, presses the pedal, and then reads the Brinell hardness number right on an incorporated depth dial indicator gage.

Rough pieces can be tested without prior buffing or grinding, and the use of a glass for reading is never necessary. There are also some diamond type hardness testers in this same line of instruments.

The use of diamonds in hardness testers has become a widely established practice, and many prefer dia-mond type instruments. It is to be expected, therefore, that companies dealing in industrial diamonds will supply such as are suitable for this purpose. Therefore, the manufacturer of hardness testers has no trouble obtaining diamonds.

Portable hardness testers are in use in some plants which employ hydraulic pressure to apply the load to a ball. Tho this is a small unit, it puts a load of 3,000 kg on a 10 mm ball. It can be used in any position, even

the it be upside down, and has been found especially suitable for armor plate work, castings and forgings.

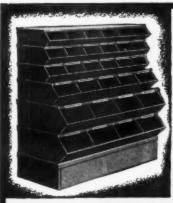
The head of the instrument is brought down by means of a hand crark to make contact with the work, after which a control valve is closed and a pump lever operated. This builds up hydraulic pressure, until an incorporated dial indicates an applied load anywhere from 250 to 3,000 kg as predetermined. There is a relief valve incorporated, also, which opens at the set load, preventing the proper pressure being exceeded, acting in a sense, as a safety valve.

### **ERRINGTON MECHANICAL LABORATORY**

MAIN OFFICE AND WORKS: STATEN ISLAND 4, NEW YORK

Chicago Office: 6701 N. SIOUX AVENUE New York Office 170 BROADWAY





# **Auxiliary Stockrooms**

### - Wherever You Need Them!

STACKBIN sections will give you a stockroom wherever you want it—quickly and easily as building a sectional bookcase. These patented sectional storage bins nest together without the use of tools—cost you nothing to build, nothing to move. Find out today how STACKBINS can lower handling costs.

Manufactured and sold in Canada exclusively by Walter H. Wickware, Ottawa

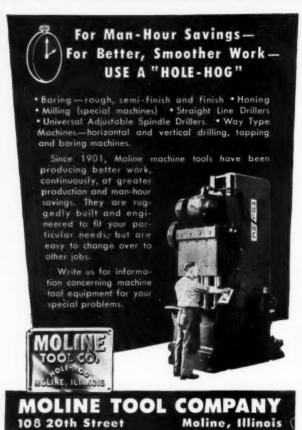
Write Stackbin Corp., 1085 Main St., Pawtucket, R. I.

STACKBIN
"Stacked and



SYSTEM

Still Accessible"



DRILL PRESS SPECIALTIES

One very interesting device that has been applied to a considerable number of drill presses of recent years, is an air-actuated travel for the spindle. This operates off of the shop air line, traverses the spindle rapidly down to the work, and provides an infinite number of feeds. The ability to obtain exactly the feed desired is valuable not only for drilling, but also when the machine is being used for reaming. As soon as the feeding action is completed, the spindle travels back to the uppermost position. The spindle can be returned to the upper position manually at any time, without waiting for the

feed stroke to be completed, however, thus making the operation perfectly safe. The depth of the cut can be very accurately controlled. The use of this air-powered feed does not interfere with toon ventional hand feed of the drill, if and when it is desired to operate the machine in that way.

Since different types of tools and devices can be adapted for holding and revolving in a drill press chuck, the machine naturally is quite versatile. A case in point is a special spindle, around which ribbon-type steel wool can be wound or wrap-ped. This provides a cylindrical, revolving pad of steel wool. Such a layout has been quite widely used for cleaning and polishing different metal parts, and espe-cially for removing burrs from the edges of nonferrous metal

steel wool is resilient, and by pressing parts against it, burrs can be removed from sides and edges in one operation. The ribbon-type steel must be wound on the spindle opposite to the direction of

rotation.

It has been observed that various shops are now employing a special form of hold-down clamp, designed to operate through a powerful handwheel-nut and screw. The screw terminates at its lower end in a clevis, which operates a powerful compound-leverage linkage for applying the pressure. The device holds firm under fast drilling, without any turning or shifting.

### No. 2 To No. 6

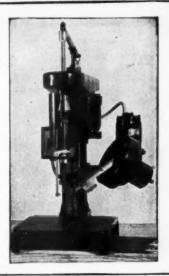
Screws Driven on this Husky but Sensitive Hopper Feed Screwdriver.

No handling of screws. Just place assembly on table, move from screw hole to screw hole. The machine does the rest.

Drives screws at one second each.

# DETROIT POWER SCREWDRIVER CO.

2809 West Fort St., Detroit 16, Mich.



# A NEW TOOL THAT DOES A HARD JOB



# PERSSON DIE JACK

Here, at last, is a new tool designed to separate die sets . . avoids makeshift prying or hammering methods. Jack is simply clamped on and handle turned to elevate or lower punch holder rapidly or slowly. A precision tool, accurately machined of finest steel and alloys.

NO PRYING • NO HAMMERING NO DAMAGE • NO INJURY • NO DELAYS

PERSSON MFG. COMPANY, 2 HENRY ST., BLOOMFIELD 4, N.J.



Pratt Grinding Gauges caliper external cylindrical jobs while work is in motion or at rest. Adapted to straight or tapered work. Tolerances of .0001" plus or minus easily maintained. Visible check on out of roundness, rough grinding and chatter. Cannot grind work undersize unknowingly. Easily installed on any grinder. Pratt Grinding Gauges increase production, eliminate scrap and assure accuracy. A modern precision tool, ruggedly built.

DIAMOND TOOL & GAUGE CO.

15920 WOODINGHAM DETROIT 21, MICH.

COLLAPSIBLE TAPS

Most machinists that have done considerable tapping on sizable holes, on work encountered in large lot sizes, are familiar in some measure with collapsible taps, which are collapsed for withdrawal at the end of the tapping stroke. These tools save much time. It is interesting to observe variations among them, found in different places. One thing that has come especially to our attention is a collapsible tap which cuts two threads of different diameters in a stepped bore, at the same time. If both steps of the bore are the same length, and tapped throughout their length, both sets of

chasers carried by such a tap engage the work at the same time. If the tapped lengths of the two diameters are different, the tool must be designed to compen-sate, by having the chasers for the longest step engage first. Then, the other set of chasers will engage at such a time as will allow both to come to the finish of the cut together. Vari-ous uses are found for a collapsing tap that will do this type of work. There is, however, one limitation. The lead of the two threads on both diameters must be the same.

Collapsible taps of receding type are used by various operators for cutting taper threads, as in pipe work, instead of using a taper attachment on a lathe for chasing such threads. Before receding collapsible taps were developed, it was almost imperative to make such threads by means of a taper attachment, for it was next thing to impossible to cut long tapered threads

with an ordinary solid pipe tap. A great amount of power was required if the use of a solid tap was attempted. Then, the tap would quite often break.

Some of the receding chaser collapsible taps on the market have a micrometer size adjustment, and the taper is cam controlled, so that it cannot vary. The general idea of such a tap is the use of short chasers, which gradually recede as the tap is fed deeper and deeper, thereby producing the taper. A very small amount of power is required for driving such a tap, as against that needed for a solid tap doing the same work. Some claim not more than one-fourth.



# Power and Foot Operated...

TAYLOR & FENN Spring Presses are used for Riveting, Staking, Stamping and similar operations on small, light parts. They are constructed to compensate for variation in thickness of the work and to deliver repeatedly a UNIFORM BLOW.

M-110 (illustrated) powered by a small reducer with a one-sixth H. P. motor, is designed to eliminate the fatigue factor inherent in foot operated Presses. A similar Press, M-120, of the same size and capacity is equipped to operate by compressed air.

### OTHER MACHINES MANUFACTURED:

Vertical Millers

Duplex Spline Millers

Medium Duty and High Speed Sensitive Drilling Machines

THE TAYLOR & FENN CO. HARTFORD, CONN. U. S. A.



WILLEY'S CARBIDE TOOL CO.

SOLE MAKERS OF WILLEY'S METAL

1342 W. Vernor Highway Detroit 1,

Michigan

IF YOU DESIGN,
MAKE OR HEAT TREAT
TOOLS OR DIES . . .

This 315-page shop hand book can be a real help to your tool makers and heat treaters. It can help them select and heat treat the right tool steel for the job. Today, "Tool Steel Simplified" is being used in many plants to improve tool performance and cut costs, to save time and money all along the line.

Send today for your copy of this authoritative, inexpensive hand book for all men who are responsible for designing, making or heat treating tools and dies.



### TOOL STEEL SIMPLIFIED

By FRANK R. PALMER
Vice-President of
The Carpenter Steel Company

315 Pages 205 Illustrations \$1,00 Postpaid in U.S.A. Elsewhere \$3,50

SURFACE GRINDERS

On surface grinding jobs involving only a few and relatively small pieces, at a given setup, it is a point in production strategy to route them to a hand feed machine. This must be small enough to be consistent with work being handled, and must offer facilities for fast set-ups. It reduces the time required for changing from one job to another, and results in a greater volume of work being performed, without working the grinder operator any harder.

One little machine that will handle a grinding area of 6x18" is available, and

has proven particularly efficient in this respect.

Another similar machine is especially efficient for the surface grinding of small machine parts, and of tools and dies.

In a number of plants, where there is not sufficient tool room work to keep toolroom grinders at hand continually employed, a machine of this kind can be set aside for given intervals of time to work on production.

Where this is done, however, either the toolroom foreman or the production foreman should have first call continually. This should be understood, so there will be no arguments arising, as to who shall have the right to the machine, if it chances to be needed by both at the same time.

A handy little surface grinder used in many plants during the last few years has the motor directly mounted on the

ball bearing spindle, and has a hydraulic table feed that is infinitely variable as to its speed. The hydraulic method of feeding the tables of surface grinders provides a very smooth advance. In consequence, there is no roughness in the grinding, resulting from chatter in the table feed.

Have you ever noticed little bench-type surface grinders equipped with magnetic chucks of permanent type operating on very small work? On work where there is no very heavy pull involved, the permanent type of magnetic chuck often is superior to the electromagnetic chuck.

### Save hands with Strand's SWEEP SAFGUARDS

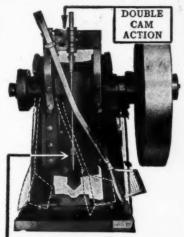
With the Strand Sweep double cam action, you obtain proper sweep movement that prevents accidents. Operation of Safguard from press head provides additional safety in case of screw or other breakage.

Send for Circulars on Strand Sweep and Enclosure Safguards

### STRAND MFG. CO.

Safety Engineers 607 W. Lake St. C

Chicago 6, III.



SAFGUARD operates from head of press

# For ASSEMBLY, BROACHING, and BENDING



1883 Greenerd

The Originators of the Arbor Press

### PRECISION WORK IN MANUFACTURING

65 Standard Styles and Sizes. Manually operated presses  $1\!\!/\!\!4$  to 35 tons pressure. Motor driven hydraulic presses  $11\!\!/\!\!2$  to 30 tons pressure.

Let us send you our catalog No. F.

### GREENERD ARBOR PRESSES

NASHUA

Est. 1883

NEW HAMPSHIDE



INDUSTRY'S NEW ALLY

An extremely interesting display of modern developments will be the attraction at the exposition of the Refrigeration Equipment Manufacturers Association at Cleveland, Oct. 29, thru Nov. 1.

The pressure of war production resulted in many new uses of refrigeration in industry. This has meant not only much saving of time, but an equally great saving in money. Subzero thermal processing is expected to be an important factor in lowering production costs when the full impact of peace time economy and competition is felt. The REMA claims that cold treating already ranks with heat treating as a primary process in some

branches of metallurgy.

Rather than merely cooling metals down to room temperature the metal is cooled right down to temperatures between 80 and 130 degrees below zero. As can be expected this causes changes to occur in their crystalline structure. These changes will cause the metal to become harder, stronger, or more pliant, depending on the many factors involved.

Not all the uses for cold treating are experimental or theoretical; most of them are being used today. For example many companies now use subzero machines for shrink fits. Stability of the metal is increased and aging is hurried by this process. But of all these uses the fact which will be of greatest interest to the machine tool industry is that TOOL STEELS have been particularly benefited.

It is claimed that cold treating many cutting tools to 120 degrees for a few hours doubles their useful life. Milling machine cutters.

machine cutters, hacksaw blades, and drills are said to have withstood continuous service which formerly would have resulted in early destruction.

It can be easily seen that the cold treating process has proved a great aid to the metal working industry. In the future still greater uses for it will undoubtedly be found. The manner in which the value of these new developments are quickly realized and utilized is only another of the many signs that the machine tool and other industries are always looking to better products and better ways of producing them. If you plan on visiting this exposition make your reservations at once.

Model 25 Hi-Duty Marking Machine

### MARK YOUR PARTS

Permanently

PART NUMBERS HEAT NUMBERS CATALOG NUMBERS SERIAL NUMBERS

PATENT NUMBERS

MANUFACTURER — INSTRUCTION DATA — INSPECTION Positive. Permanent marking on your products assist prospects to order. Makes it easier to buy—new, repeats and repairs. Gives you a definite record of pertinent data on each part produced.

The Pneumatic marking machine illustrated is our HI-DUTY model 25 general purpose tool for short runs or production work. It operates from your shop air line and is one of numerous models built to produce neat, permanent markings quickly on metal fabrications. We will be happy to make specific recommendations upon receipt

We will be happy to make specific recommendations upon receipt of samples or prints of parts to be marked, showing approximate lettering, its location on the part, with required hourly production.



### MARKED PARTS ADVERTISE

IN THE RIGHT PLACE, AT THE RIGHT TIME

Send for complete catalog of our full line of marking Tools, Machinery and Equipment,

GEO. T. SCHMIDT, Inc.

1802 W. Belle Plaine Ave.

Chicago 13, III.



CIRCLE
CUTTING
ATTACHMENT
included\_2s
STANDARD
EQUIPMENT
with this
machine

LIBERT MACHINE CO. GREEN BAY . WISCONSIN

# for BETTER PRODUCTION and MAINTENANCE at lower cost

A proved time-saver in any sized shop, Libert's flexibility gives you a wider variety of work—clean shearing of flat or formed sheet metal...straight or irregular shapes...inside or outside cuts. Libert simplicity means that even unskilled labor soon does accurate work, lots of it and fast!

Write for bulleting

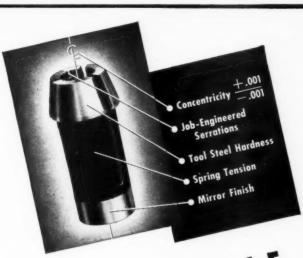
Made In sizes up to 60 in. throat, 10 gauge capacity

Libert Hi-Speed SHEAR

# Mechanics Through the Ages



NALTY, THAT ALL SUCH WORK BE TAKEN TO ACCREDITED BLACKSMITHS AND REQUIR-ING THAT THE BLACKSMITH'S MARK BE STAMPED ON ALL LARGE OR IMPORTANT WORK.



# DEPENDABLE...

for quality in material and workmanship, developed through years of experience in

Improved and modern methods of manufacture engineering and building collets. provide Allen Products with durability and inter-

changeable uniformity of type and size.

Let the Allen Representative in your territory, or an Allen Engineer solve your collet problems,

with JOB-ENGINEERED Collets. ALLEN COLLET AND MANUFACTURING CO., INC. ALLEN CULLET AND MANUTACTURING CO., INC.
240 SALLIOTTE STREET . ECORSE 18, MICHIGAN

# Productioneering In Metal

Productioneering, as practiced by Sommer and Adams is the simultaneous planning of production method, in collaboration with the producer, aiming at lowest cost with assured consistency of high quality. MODERN producers of metal goods are constantly coming face to face with processing-for-profit problems for which the right solution lies in functions for which no proper machinery exists... in methods and machines as yet "undreamed, but dreamable". Such distinctly special purpose machinery is produceable only by organizations with a particular "know how" in the realm of out-of-the-ordinary production engineering.

The modern plant above houses just such an organization. The Sommer and Adams Company, with a quarter of a century of experience backing up our oft repeated claim that... "If it can be made automat-

ically . . . Sommer and Adams can build you a machine to make it . . . "

Let your imagination romp in applying these questions to YOUR production . . .

1... Is there any possibility of new or combined automatic operations to eliminate cost factors (no matter how unusual)?
2... Is the market potential adequate to pay off on the increased production such

2...Is the market potential adequate to pay off on the increased production such improved methods will develop?

If answers are affirmative, Sommer and Adams Productioneering can help you.



SUBSIDIARY OF THE FEDERAL MACHINE AND WELDER COMPANY

# DIAMOND POINT EMERY WHEEL DRESSERS



A very efficient tool for dressing Emery Wheels. Diamonds are mounted in 7/16" diameter rods 6" long.

- 1/4 KT. FOR USE ON 6" DIA. WHEELS OR SMALLER \$2.25 each net
- 1/2 KT. FOR USE ON 8" DIA. WHEELS OR SMALLER \$3.75 each net
- % KT. FOR USE ON 10" DIA. WHEELS OR SMALLER \$5.50 each net
- 1 KT. FOR USE ON 12" DIA. WHEELS OR SMALLER \$7.50 each net
- 1½ KT. FOR USE ON 24" DIA. WHEELS OR SMALLER \$12.00 each net
- 2 KT. FOR USE ON 30" DIA. WHEELS OR SMALLER \$14.00 each net

MOUNTED FREE IN ANY DESIRED HOLDER

SEND FOR OUR CIRCULARS

#### VICTOR MACHINERY EXCHANGE, Inc.

251 Centre Street

New York, N. Y.

Phone: CAnal 6-5575

#### Immediate Delivery

No. 1 to 60
New High Speed
Long Length
DRILLS

No.	by	GAGE	LENGTH	OUR PRICE NET EACH
1	to	10	61/4"	\$ .90
11	to	20	53/4"	.80
21	to	30	53/8"	.70
31	to	40	51/4"	.60
41	to	50	41/2"	.50
51	to	60	31/2"	.40



IF YOU BUY 24 OR MORE—10% DISCOUNT IF YOU BUY 60 OR MORE—20% DISCOUNT IF YOU BUY 100 OR MORE—25% DISCOUNT

#### Victor Machinery Exchange, Inc.

251 Centre Street

Phone: CAnal 6-5575

NEW YORK 13, N. Y.

#### IMMEDIATE DELIVERY

## HIGH SPEED STEEL, STRAIGHT SHANK TWIST DRILLS

EXTRA LENGTH



#### 9" CUTTING FLUTES — 12" LONG DRILLS

SIZE	LENGTH OVERALL INCHES	LENGTH FLUTES INCHES	PRICE EACH NET	SIZE	LENGTH OVERALL INCHES	LENGTH FLUTES INCHES	PRICE EACH NET
1/8"	12	9	\$1.50	21/64"	12	9	\$2.25
9/64"	12	9	1.50	11/32"	12	9	2.25
5/32"	12	9	1.50	23/64"	12	9	2.50
11/64"	12	9	1.50	3/8"	12	9	2.50
3/16"	12	9	1.50	25/64"	12	9	2.75
13/64"	12	9	1.60	13/32"	12	9	2.75
7/32"	12	9	1.60	27/64"	12	9	3.00
15/64"	12	2	1.75	7/16"	12	9	3.00
17 /6 AT	12	9	1.85	29/64"	12	9	3.25
0/33"	12		1.85	15/32"	12	9	3.25
19/64"	12	ő	2.00	31/64"	12		3.25
5/16"	12	é	2.00	1/2"	12	9	3.25

### HIGH SPEED STEEL, TAPER SHANK TWIST DRILLS

#### EXTRA LENGTH

SIZE	LENGTH OVERALL INCHES	LENGTH FLUTES INCHES	PRICE EACH NET	SIZE	LENGTH OVERALL INCHES	LENGTH FLUTES INCHES	PRICE EACH NET
17/32"	15	12	\$6.50	27/32"	15	12	\$11.50
9/16"	15	12	7.00	7/8"	15	12	12.00
19/32"	15	12	7.50	29/32"	15	12	12.50
5/8"	15	12	8.00	15/16"	15	12	13.00
21/32"	15	12	8.00	31/32"	15	12	14.00
11/16"	15	12	8.25	1"	20	15	16.00
23/32"	15	12	8.50	1-1/16"	20	15	17.00
3/4"	15	12	8.50	1-1/8"	20	15	18.00
25/32"	15	12	9.50	1-3/16"	20	15	20.00
13/16"	15	12	11.00	1-1/4"	20	15	22.00

#### Victor Machinery Exchange

INC

251 CENTRE STREET

NEW YORK 13, N. Y.

PHONE: CAnal 6-5575

# YOU'LL

#### PRODUCTS ADVERTISED THIS ISSUE

Abrasive Cloth. Paper. Disc. Pelts, Wheels, Stones, Etc., 32b, 32c, 92, 126, 127, 194, 195, 301 Accumulators, 196 Aftercooler Systems, 356
Air-Operated Equipment (Look for specific item) Air-Operated Equipment (Loses Alloys, 264 Angle Blocks, 88 Angle Feed Fixture, 292 Angle Rolling Machines, 323 Angles, 93, 213 Arbor Spacers, 275 Advances, 275

Balancing Machines, 7, 203, 206 Balancing Ways, 337, Bearings, Ball, 50 Bearings, Roller, 56, 386 Bearings, Sleeve, 59 Hearings, Sieeve, 59
Belt Lacers & Hooks, 316
Bending Equipment, 78
Bins, 218, 379
Blades, Band Saw, 44
Blocks, Magnetic, 164
Blocks, Parallel-Netup, 206
Blowers, 61, 186, 363,
Berling, Drillins and Milling Machines, 149, 299, 369,

Arbors, 76

280
Boring, Drilling & Milling Attachments, 301
Boring, Drilling and Tapping Machines, 380
Boring, Faleng & Threading Tools, 357
Boring Heads, 163, 239, 355
Boring Machines, 143, 212, 389
Boxes, Shop, 299
Boxes, Stacking, 299, 37, 37
Brakes, Press and Bending, 41, 46
Broaching, 76, 89
Broaching, 76, 89
Broaching, Machines, 76
Burring Squipment, 369 380

Burring Equipment, 369 Burs, 153 Bushings, Drill Jig. 183, 289, 349 Bushings, Tungsten Carbide, 147

Callpers, 162
Callpers, 162
Carbide Tool Grinders, 176
Carbide Tool Grinders, 176
Carbide Tool Grinders, 176
Carbide Tool Grinders, 176
Carbide Machines, 221, 229
Carbide Machines, 221, 229
Centering Machines, 25, 219
Centers, Live, 67, 85, 102, 104, 107, 105, 179, 305
Centers, Live, 67, 85, 102, 104, 107, 105, 179, 305
Centers, Live, 67, 85, 102, 104, 107, 105, 179, 305
Chains and Sprockets, Back Cover
Chueking and Indexing Fixtures, 341
Chueking Machines, 25
Chueks, Air-Operated, 221
Chueks, Gring, 288
Chueks, Collet, 233, 378
Chueks, Lathe, 173, 393, 244, 253
Chueks, Lathe, 173, 42, 193
Chueks, Lathe, 173, 42, 193
Chueks, Lathe, 173, 43, 193
Chueks, Lathe, 173, 43, 193
Collet Chuek Attachments, 287
Collet Chuek Attachments, 287
Collets, 3, 241, 378, 389
Comparators, 21
Compressors, Air and Gas, 66
Controlling Devices, 221, 233, 246
Controlling Devices, 221, 233, 246
Connectiones, 36, 137, 174
Countribores, 36, 137, 174
Countribores, 36, 137, 174
Countribores, 36, 137, 174
Countribores, 36, 137, 174

Couplings, Flexible, 57, 318
Couplings, Torque Control, 206
Cut-Off Machines, 404
Cutting Machines, Die, 133
Cutting Tools, 106, 120, 137, 166, 238
Cutters, Bod, 234
Cutters, Rod, 234
Cylinders, Hydraulic and Pneumatic, 32, 217, 223

Demagnetizers, 193, 359
Diamond Dressers, 315
Diamond Dressers, 315
Diamond Wheels, 160, 215
Diamond Wheels, 160, 211
Diamonds and Diamond Tools, 160, 360
Die Filing Machines, 294
Die Heads, Threading, 205, 317
Die Jacks, 381
Die Machines, 21, 201 Die Jacks, 381
Die Making Machines, 31, 291
Dies, St. 166, 182, 359
Dies, Washer, 222
Die Sets, 357
Dividing Hosse, 222
Die Sets, 357
Dividing Hosse, 362
Dividing Hosse, 363
Dressers, Angle & Radius, 392, 321, 335
Dressers, Angle & Radius, 392, 321, 335
Dressers, Lanery Wheel, 391
Dressing Flytures, Grinding Wheel, 294, 245, 335
Drill Machines, Grinding Wheel, 294, 245, 335
Drill Heads, 259, 345, 371
Drilling Machines, Hadial, 115, 239
Drilling Machines, Hadial, 115, 239
Drilling Machines, Hadial, 115, 239
Drilling Center, Core, Twist, Square, etc., 137, 283, 399, 392, 393
Drillis, Gun, 241
Drills, Portable Electric, 96, 157, 404
Drills, Portable Electric, 96, 157, 404
Drills, Portable Electric, 96, 157, 404
Drills, Portable Electric, 39, 494

\*\*PAMILL \$22, 273, 283, 289

\*\*PAMILL \$22, 273, 283, 289

\*\*PAMILL \$22, 273, 284, 289

\*\*PAMILL \$22, 273, 284, 289

\*\*PAMILL \$22, 273, 284, 289 Die Making Machines.

End Mills, 137, 271, 283, 309 Engines, Diesel, 66

Facing Material, Hard, 248
Facing Tools, 36
Facing Tools, 36
Feed Fingers, 378
Feeds, Drill Press, 324
Feeder, Gauges, 220
Files, 51, 135, 329
Files, Rotary, 151, 329, 350
Finishing Tools, Front Cover
Flexible Shaft Equipment, 73, 84, 145, 235
Furnaces, Heat Treating, 38, 52, 69, 198, 267, 343, 339

Gage Blocks, 233
Gago Makers Supplies, 347
Gago, 576, 81, 118, 140, 292, 382
Gages, Gear, 291
Gages, Thread Ring, 13, 95
Gauge Stock, 229
Gear Shapers, 229 Gear Shapera, 229
Gears and Gear Units, 305, 369
Gelarders, Abrastve Belt, 111, 259, 347
Grinders, Atr, 99, 262
Grinders, Backstand, 253
Grinders, Backstand, 253
Grinders, Bench, 172, 191, 246, 401
Grinders, Centerless, 8, 9, 234
Grinders, Cylindrical, 13, 13
Grinders, External or Internal 45, 188

#### URGEST MANUFACTURER OF A COMPLETE LINE OF

LATHES!







A lathe for every purpose in every size from 13" to 50" swing !



The R. K. LE BLOND

MACHINE TOOL CO. CINCINNATI 8, OHIO

NEW YORK 6, Singer Bldg., 149 Broadway, COrtlandt 7-6621-2-3

CHICAGO 6, 20 N. Wocker Drive, STA 5561

Grinders, Hydraulic, 8, 9
Grinders, Flute, 343
Grinders, Knife, 30
Grinders, Knife, 30
Grinders, Knife, 30
Grinders, Grinders, 131, 404
Grinders, Profile, 236
Grinders, Profile, 236
Grinders, Swing Frame, 254
Grinders, Swing Frame, 254
Grinders, Thoel and Cutter, Inside Back Cover
Guards, 282, 294, 385, 397
Guides, Band Saw, 208
Guides, Sav, 255
Guides, Man Saw, 208
Guides, Man Saw, 259
Guides, Man Saw, 2

Hammers, 10, 293 Handles, 351 Hinges, 367, 371 Holders, Tap, 39, 56 Holders, Tool, 4, 52, 85 Holders, Type, 365 Honing Machines, 12

Hydraulic Equipment (Look for specific item)

Index Plates. Index Plates, 269 Indexing Heads, 269 Indicators, 131, 260 Inspection Devices, 256

Jigs and Fixtures, 81, 257, 279 Joints, Universal, 86, 187

Keyseaters, 311 Keyway Cutting 3 Knobs, Hand, 351 Knurls, 260, 314 Machines, 270, 283

Lapping Equipment, 140, 377 Laps, 31 Laps. 31
Lathes, Automatic, 21, 26, 205, 224, 395
Lathes, Bench, 64, 71, 100, 101, 273, 319
Lathes, Engine and Toolroom, 68, 75, 124, 268, 395
Lathes, Polishing, 64, 464
Lathes, Production, 98, 109, 224, 395, 404
Lathes, Turret, 2, 7, 21, 122, 169, 263, 401
Latyout Materials, 218, 276, 367, 369
Levers, Malleable Iron, 351
Lighting Equipment, 312
Locators, Optical, 263 Lubricating Devices, 372 Lubricating Systems, 15, 37 Lubricators, 37

Audireacors, 5r

Maintenance Materials, 152, 371

Mandrels, 349

Manuals, Tool Steel, 284

Marking Machines, 228, 265, 387

Measuring Apparatuses, 27, 159

Micrometers, 175, 369

Milling Cutters, 319

Milling Machines, Automatic, 117, 139, 149

Milling Machines, Hench, 171, 319

Milling Machines, Hand, 277

Milling Machines, Hand, 277

Milling Machines, Tube Holling, 214

Milling Machines, Tube Molling, 214

Milling Machines, 221, 230, 247, 273, 383 Motors, 47, 186

Numbering Machines, 295 Nut Setters, 63, 374, 404 Oll Stones, 251

Pantograph Machines, 133 Partilejs, Box, 213
Parallels, Box, 213
Patent & Trademark Service, 237
Plates, Surface, 22, 161, 213, 341
Plug Gages, 48
Polishing Machines, 114, 390
Englishing, 242 Positioners, 219
Presses, Arbor, 273, 385
Presses, Drill, 117
Presses, Foot, 156, 199, 359, 363, 373, 376
Presses, Gap. 46
Presses, Hydraulic, 46, 65, 196
Presses, Punch, 192, 222, 353 Positioners, 210

Presses Spring, 383 Profile Projectors, 27 Pullers, Die Set, 43 Profile Projectors, 27 Pullers, Die Set, 42 Pullers, Wheel, 286 Pumps, 186 Pumps, Coolant and Lubricant, 121 Pumps, Hydraulic, 66, 94, 196, 243 Punch & Shears, 11 Punches, 350 Pyrometers, 260 Reamers, 11, 137, 304, 309 Reaming Machines, 286 Rectifiers, 193 Reels, Stock, 216, 269 Retaining Rings, 103 Riveting Machines, 110 Roll Feeds, 182 Roughing Tools, Front Cover

Sanding Equipment, 282, 330 Sanding Equipment, 282, 339
Saw Sharpenera, 363
Sawing & Filing Machines, 279
Sawing Machines, Band, 49, 131, 239, 393, 365
Sawing Machines, Circular, 230, 399, 363
Sawing Machines, Circular, 230, 399, 363
Sawing Machines, Circular, 230, 399, 363
Sawing Machines, Hack, Inside Front Cover, 131, 193, 365, 367
Sawing Machines, Hack, Inside Front Cover, 131, 193, 384
Sawing, Machines, Hand, 196
Serew Drivers, Air, 374
Serew Drivers, Air, 374
Serew Drivers, Air, 374
Serew Machines, Hand, 109, 101
Serews, Cap, Set, Socket and Machine, 225, 258, 269, 266

Screws, Cap. Sect. Socket and Machine, 225, 255, 269, 266
Separators, Moisture, 350
Separators, Moisture, 350
Separators, Moisture, 350
Services; Milling, Grinding, Lapping, Rebuilding, Repairing, Business, etc., 25, 189, 194, 195, 266, 289
Shanks, Taper, 112
Shapers, 32a, 33d, 117, 199, 207, 273
Shearing, Machines, 396, 337, 375, 387
Shearing, Machines, 396, 337, 375, 387
Shearing, Portable, 309
Shields, Fare, 397
Stevers, 112
Special Collers, 53, 223
Specid Reducers, 276, 279
Spacing, Collers, 53, 233
Specid Reducers, 276, 279
Spindles, Surface Grinder, 87
Spot Facers, 394
Spring Winders, 357
Stamps, 228, 295, 360
Steel and Steel Stock, 19, 128, 131
Stock Stands, 306
Stud Setters, 226
Superfinishing Machines, 7, 203
Switches, Moiss, 26

Superfinishing Machines, 7, 203 Switches, Motor, 25, 193 Surfacers, Belt, 284

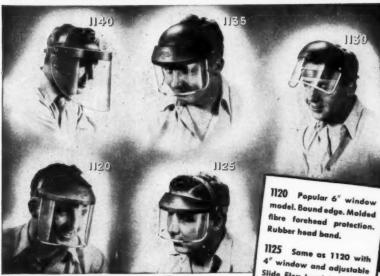
Tables, Elevating, 361, 371
Tables, Layout, 367
Tables, Radial Drill, 339
Tables, Rotary and Index, 52, 167, 359, 373, 375
Tap Extractors, 366 

Trucks, Hydraulic Lift, 308 Turrets, Lathe, 58, 190, 232, 360

Valves, 23, 35, 170, 217, 246 Valves, Hydraulic, 94, 196, 243 Vises, Alr, 184, 246 Vises, Bench and Machine, 136, 193, 240, 252, 270, 273, 280, 313, 359, 360, 377 Vises, Drill Jig, 116

Washers, 222, 270
Welding Equipment and Supplies, 1, 29, 119, 210, 403
Wheels, Band Saw, 255
Wheels, Hand, 351 Wire Strippers, 242 Wrenches, Pneumatic, 66, 325

#### DOCKSON FACE SHIELDS



Dockson Featherweight Face Shields are designed and constructed to meet every requirement of safety and comfort. Light, well ventilated and sturdy, these nationally known face shields provide maximum protection on the job for which they are designed.

Wide vision Cellulose Acetate windows, bound in rustproof metal channels. Comfortable molded head gears with felt cushioned, leatherette pads are only two of the many features which make Dockson Face Shields the

choice of the man who wears them.

Write for complete information and catalogue.

4" window and adjustable Slide Flex head band.

1130 4" metal band window. Detachable, pivoting, half skull guard, Slide Flex head band.

1135 Popular 4" window shield. Formed fibre forehead protection pivots over half skull guard. Slide Flex head band.

1140 Excellent wide coverage protection, 8½" detachable window. Heavy duty adjustable window, maximum ventilation.



CORPORATION Detroit 8, Mich

#### **Index to Advertisers**

Abart Gear & Mach. Co	Chicago Mfg. & Distributing Co. 6   Chicago Pneumatic Tool Co. 66   Chicago Pneumatic Tool Co. 66   Chicago Pneumatic Tool Co. 66   Chicago Rivet & Mch. Co. 110   Chicago Tool & Engineering Co. 249   Chicago Mheel & Mfg. Co. 194-195   Chicago Wheel & Mfg. Co. 194-195   Chicago Wheel & Mfg. Co. 194-195   Chicago Mheel & Mfg. Co. 194-195   Chicago Mheel & Mfg. Co. 207   Chicago Hilliam Machines
B-H   Instrument   Co.	Dahlstrom Mfg. Co.   339     Danly Machine Specialties.   284     Davies & Son, Charles K.   227     Davies & Son, Charles K.   237     Davies & Thompson Co.   369     Dayton Rogers Mfg. Co.   362     Dayton Rogers Mfg. Co.   323     Dearborn, Inc., Howard.   85     Dearborn, J. W.   341     Delco Products Div.   47     Delco Products Div.   47     Delco Products Div.   48     Delloy Metal Corp.   238     Dempsey Industrial Furnace Corp.   343     Delroit Power Mfg. Co.   345     Detroit Stamping Co.   381     Detroit Stamping Co.   381     Detroit Stamping Co.   382     Detroit Machine Co.   88     Diamond Wheel Industries.   327     Diell Machine Works, G. M.   122     DoAll Company   17     Dockson Corporation   397     Dorman Machine Tool Wks.   303     Derman Machine Tool Wks.   303     Dremei Mg. Co.   41     Dremei Mg. Co.   39     Divreall Mfg. Co.   333     Dyskem Co.   218     Dyskem Co.   218     Devent Mfg. Co.   333     Dyskem Co.   218     Dyskem Co.   218     Devent Mfg. Co.   318     Dyskem Co.   218     Dayton Mg. Co.   318     Dyskem Co.   318
C & N Mfg. Co	Eastern Tool Supply Co.         310           East Shore Machine Products Co.         22           Economy Mch. Products Co.         266           Economy Tool & Machine Co.         289           Elsier Engineering Co.         119           Electro-Matic Products Co.         42           Eligh Tool Works.         100-101           Elmes Engineering Works.         196           Enco Manufacturing Co.         58           Errington Mechanical Laboratory.         379           Esco Engineering Corp.         257           Etna Machine Co.         214           Ettee Tool Company.         155           Excecisor Tool & Machine Co.         323

## HEAT TREAT SMALL PARTS

In Your Own Plant

#### ESSENTIAL FOR TOOL AND DIE SHOPS

You save time and money heat treating small tools and dies in a Cooley Electric Furnace. Uniform temperatures are maintained throughout the furnace chamber to assure even heating of parts. The heating elements are embedded in refractory materials, protecting against atmospheric attack. They are

easily replaceable. Profitably Used For:

1. Hardening Tools, Dies, Machine Parts, etc., Promptly and at Job Location.

2. Drawing or Tempering Metals and Small Metal Parts without Incurring the High Costs Involved with Larger Furnaces. 3. A Preheat Furnace Prior to High Speed Hardening.

4. Handling Emergency Repair Work Rapidly and without Delay.

5. Experimental Testing to Predetermine Production Heat-Treating Procedures.

6. Many Miscellaneous Purposes.

#### TWO NEW OPTIONAL FEATURES AVAILABLE



1. Vertical Lift Door - Counter weighted for ease of operation-conserves heat where door need not be fully opened to enter or remove work. Supplied in place of standard hinged hearth door at \$20.00 additional to regular furnace prices shown below.



Type	Chamber Capacity	Amps 115 V	Watts	Amps 230 V	Price	
MH-3 MH-4	8"W 6"H 14"L 10"W 6"H 18"L	29.6	3400 4800 *Include	14.8 20.9 les Hes	\$146.00* \$222.50* orth Plate	

MAX. SAFE TEMPERATURE — Continuous operation, 1750° F.; Intermittent operation, 1850° F. AUTOMATIC CONTROL—Indicating Controlling Pyrometer—Thermo-couple and lead wire—approximately \$150.00.

2. Heavy Gauge Steel Stand - For ease of installation and operation-locates furnace at most convenient operating height and provides additional working and storage space. Add \$35.00 to regular furnace prices shown below.



Ask for free infor-mation and ordering instructions so you can make your own decision and determine your own requirements. Write for Bulletin No. 50 today-no obligation.



#### COOLEY ELECTRIC MANUFACTURING CORP.

36 South Shelby Street Indianapolis 7, Indiana

INDIANAPOUS MACHINERY EXPORT CORP.

Export Manager, 44 Whitehall Street, New York, New York

F & M Sales Co	Jefferson Machine Tool Co.         360           Johansson Div. (Ford Motor Co.)         233           Johnson Gas Appliance Co.         198           Johnson Machine & Press Corp.         373           Jones & Lamson Machine Co.         21
Federal Press Co.         376           Fellows Gear Shaper Co.         229           Fenn Mfg. Co.         32           Firth-Sterling Steel Co.         19           Flexolap Mfg. Co.         331           Flexock Company         152           Ford Manufacturing Co.         M.A.         350           Ford Motor Co.         (Johansson Div)         233           Fostoria Pressed Steel Corp.         18           Fulflo Specialties Co.         121	Kaufman         Mfg.         Co.         274           Keurner         Trecker         Corp.         139           Keunametal,         Inc.         318           Kingsbury         Machine         Tool         Corp.         32           Knu-Vise,         Inc.         74
Gairing Tool Co         174           Galland Henning Mfg. Co         217           Gallaneyer & Livingston Co         1636           Gardner Machine Co         105           Gear Grinding Machine Co         57           General Die & Stamping Co         37           General Die & Mig. Co         36           General Die & Mig. Co         36           Geometric Tool Co         205           Gerotor May Corp.         94           Gilman Engineering & Mfg. Corp.         71           Gils Brothers Mfg.         372           Glenzer Co. J. C         112           Gorton Machine Co         123           Groth Selson Corpany         133           Grand Mg. & Machine Co         113           Grand Mg. & Machine Co         118           Grand Mg. & Machine Co         187           Great Lakes Broach & Gage Co.         76           Greaves Machine Tool Co         286           Greney Manufacturing Co         365           Grenby Manufacturing Co         360           Grinders & Flytures Inc         270           Grobet Flie Co. of America         320,329           Grune Gauge Company         168     <	L. & J. Press Corp
Hall Mfg. Co	M.B. Products
Ideal Industries, Inc	Monarch Machine Tool Co.   224
7. & S. Tool Co	National Acme Co.         25           Nedco Co.         282           Nelco Tool Co.         271



Designed for use on the 5D2-12" and the SD2E-15" machines — with T-slot on center with the spindles, maximum rigidity is secured by the overhead Pilot. These fixtures are available for both five and six face Turrets. The obvious sturdiness and rigidity of the horizontal slide for holding the cutter blocks is assurance of rapid and accurate stock removal to the limit of the cutters. The Slide Tool T-slot has ample space for cutter blocks to machine work pieces at the front and at the rear of the double-spindle, double-production machines.

This Slide Tool also may be used for internal recessing cuts, as well as for taper boring or turning with the proper cam path fastened to Cross Slide Base of the bed of machine.

Production cost will be a critical factor in the postwar world. This helpful catalog will present you with many constructive ideas that will assist you in making your Potter & Johnston machines more productive. If you are a user of our machines it will be sent to you, on request. This versatile tool is one of a broad line of production aids available for reducing manufacturing costs.



The POTTER & JOHNSTON MACHINE CO. PAWTUCKE

RHODE ISLAN

New Albany Machine Mfg. Co.         222           New Britain Tool & Mfg. Co.         360           New Method Steel Stamps, Inc.         369           New Milford Carbide Tool Co.         252           New-Field Machinel Parts Co.         120           Nicholason & Co.         W. H.         171           Nicholason & Co.         W. H.         179           Nicholason File Co.         135-151           Nielsen, Inc.         365           Nielsen Tool & Die Co.         20           Nobur Mfg. Co.         360           Norgen Co., C. A.         37           Norton Company         32b-3cc           Numberall Stamp & Tool Co.         295	South Rend Lathe Works
Oliver Instrument Co	
Paddock Tool Co         208           Persson Mfg. Co         381           Plunket Machine Co., J. E.         252           Pneumatics, Inc.         332           Pope Machinery Corp.         87           Porter-Cable Machine Co.         111           Potter & Johnston Mch. Co.         401           Pratt & Whitney.         153           Procunier Safety Chuck Co.         259           Production Machine Co.         284           Prutton Machine Co., D. H.         60           Pyrometer Instrument Co.         260	Tamms-Silica Co.   371
Quality Tool & Die Co	I'. S. Electrical Tool Co
R & L Tools	Unique   Manufacturing   Co.   232   232   232   232   233
Roofe Machine Wks, Inc.         104           Ross Operating Valve Co.         35           Rotor Tool Co.         63           Rouse & Co.         H.B.         277           Rusnok Tool Works.         301           Rutland Tool Service.         189           Ryerson & Son, Inc., Jos. T.         128	Wade Instrument Co.         270           Wade Tool Co.         68           Waldes Kohinoor, Inc.         103           Walker-Turner Co.         230           Wall Columnoy Corp.         248           Walls Sales Corporation         250           Watton Co.         306           Wardwell Mfg. Co.         343           Warren City Mfg. Co.         46
8. & E. Machine Products	Walls Sales         250           Walton Co.         36           Wardwell Mig. Co.         36           Wardwell Mig. Co.         46           Warsen City Mig. Co.         48           Warsen City Mig. Co.         48           Weber Machine Corn.         242           Weber Machine Corn.         92           Whalley Co., George.         287           Whalley Co., George.         287           William Corp.         21           Wilchman Corp.         21           Wilchman Corp.         21           Willey's Carbide Tool Co.         383           Wilson, K. R.         65           Wirth & Son, Carl.         185           Woodworth Co. N. A.         95           Wyzenbeek & Staff, Inc.         235
Skilsaw, Inc. 49 Smith Boring Chuck Co. 288 Sommer & Adams Co. 390	Yobe Supply Co., Wm. S.         306           Yost Mfg. Co.         280           Young Arbor Press Co.         349



Trindl Super Industrial Arc Welders are especially designed and constructed for low-cost, high-speed maintenance and production welding, where ease and speed of operation are essential.

"Job-Tested" Trindl Welders — acclaimed for superior performance, ruggedness, dependability, and economical operation wherever used—are rolling up impressive production records.

● Trindl Arc Welders are the result of many years of careful engineering and "job-tested" research, and are manufactured in a range of distinctive sizes to accommodate every type of shop and production welding job.

• Step up production schedules twenty to forty percent — with an easy-to-operate TRINDL SUPER INDUSTRIAL ARC WELDER... also to save both time and money there are TRINDL welding supplies, accessories, and electrodes. Write, wire, or...phone for full details.



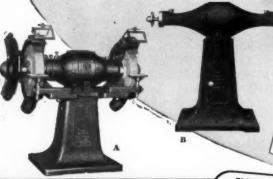
# ENGINEERED EFFICIENCY

THE CINCINNATI name stands for more than fine electrical tools—it stands for ENGINEERED EFFICIENCY. That's why you can depend on THE CINCINNATI Electrical Tools for maximum production at minimum cost.

- A BALL-BEARING PEDESTAL GRINDER—Designed and built for continuous production work and all general purpose grinding. Sizes: ¼ to 15 H.P.
- B BUFFING AND POLISHING LATHE—Especially designed, ruggedly built, for continuous service under most severe conditions. Sizes: ½ to 15 H.P.
- C TOOL POST GRINDER—With or without feed, especially adapted for grinding lathe centers, cutters, reamers, rolls, dies, etc. Can be used in shaper or planer for surface grinding, Sizes: ¼ to 1 H.P.
- D STANDARD DUTY BALL-BEARING ELEC-TRIC DRILL.—For general maintenance work in industrial plants, small shops of all kinds. Sizes: ¼ to 1¼ inches.

Write today for complete details.





Tappers Routers Nut Setters Speed Lathes Screw Drivers Electric Drills Aerial Grinders Tool Post Grinders Abrasive Cut-Off Machines Bench and Pedestal Buffers Air Master Dust Collectors Bench and Pedestal. Grinders

The Ancimath

ELECTRIC DRILLS - GRINDERS BUFFERS - PORTABLE TOOLS AIR MASTER DUST COLLECTORS

THE CINCINNATI ELECTRICAL TOOL CO

Division of THE R. K. LeBLOND MACHINE TOOL CO.

2620 MADISON ROAD · · CINCINNATI 8, OHIO

#### TO HANDLE COMPLEX TOOL GRINDING JOBS

EXTREME FLEXIBILITY
of the No. 4 Universal Cutter and
Tool Grinder permits two ways
of performing nearly every
operation: 1. With the
spindle head locked, the sleeve
and knee swivel around the
column; 2. With the sleeve locked
the head swivels on the
column.

VERSATILITY of the No.4
Universal Cutter and Tool
Grinder makes all of the
following grinding jobs practical
and simple:

GEAR CUTTER GRINDING
ANGLE CUTTER GRINDING
INTERNAL GRINDING
CYLINDRICAL GRINDING
FACE GRINDING
FACE MILL GRINDING
END MILL GRINDING
FORMED CUTTER GRINDING
SURFACE GRINDING
HOB GRINDING

Write for Bulletin 1045)

with maximum speed and convenience

#### use G&L's GRAND RAPIDS No.4

**Universal Cutter and Tool Grinder** 



CONVENIENT OPERATION permits control of machine from either front or rear. Power feed providing & applitudinal table speeds and wet grinding are available.

GALLITER ANTIGETOR CO.

What "GRAND RAPIDS" Quality Means: G & L cast their own close-grained gray iron, machine all parts to micrometric tolerances, and precision-assemble grinding machinery of unsurpassed performance. Grand Rapids means top quality in grinding machinery.

GALLMEYER & LIVINGSTON CO., 405 STRAIGHT ST., S. W., GRAND RAPIDS 4, MICH.

FOR EVERY

# TRANSMISSION

NEED

2,000 TYPES OF



#### Write For Your Copy . . . .

This valuable booklet contains much useful data and facts for sprocket buyers. It describes more than 2,000 types of Cullman Sprockets with dimensions.

#### **CULLMAN SPROCKETS**

Top efficiency is assured by Cullman's long and specialized experience... and fast, low-cost, high-precision production methods. In stock designs—there's a size and type of Cullman Sprocket for almost every need—ready for immediate delivery. "Specials"—to your specifications—can be made up in a very short time because of exclusive Cullman methods and highly specialized equipment. Let us help you match Cullman Sprockets to your specific applications.

#### CULLMAN WHEEL COMPANY

1350 WEST ALTGELD STREET

CHICAGO 14, ILLINOIS

